# AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

| 1. CONTRACT ID CODE | PAGE OF PAGES | |
|---|---|---|
| J | 1 | 64 |

| 2. AMENDMENT/MODIFICATION NO. | 3. EFFECTIVE DATE | 4. REQUISITION/PURCHASE REQ. NO. | 5. PROJECT NO.(If applicable) |
|---|---|---|---|
| 0001 | 10-Jun-2004 | W38XDD-0217-2004 | |

6. ISSUED BY CODE W912P5

US ARMY CORPS OF ENG.-NASHVILLE- W912P5
CELRN-CT, ROOM A604
110 NINTH AVE. SOUTH
P O BOX 1070
NASHVILLE TN 37202-1070

7. ADMINISTERED BY (If other than item 6) CODE H3P0000

CONTRACTING DIVISION(BCN)
ATTN: BERYL NEWSOME
(615) 736-7933 FAX (615) 736-7124
BERYL.C.NEWSOME@USACE.ARMY.MIL
NASHVILLE TN 37202

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)

CODE FACILITY CODE

| | |
|---|---|
| X | 9A. AMENDMENT OF SOLICITATION NO. W912P5-04-R-0012 |
| X | 9B. DATED (SEE ITEM 11) 24-May-2004 |
| | 10A. MOD. OF CONTRACT/ORDER NO. |
| | 10B. DATED (SEE ITEM 13) |

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer [ ] is extended, [X] is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning 2 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS.
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

[ ] A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

[ ] B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

[ ] C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

[ ] D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor [ ] is not, [ ] is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

The following changes are incorporated into the above solicitation.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

| 15A. NAME AND TITLE OF SIGNER (Type or print) | 16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) |
|---|---|
| | TEL: EMAIL: |

| 15B. CONTRACTOR/OFFEROR | 15C. DATE SIGNED | 16B. UNITED STATES OF AMERICA | 16C. DATE SIGNED |
|---|---|---|---|
| (Signature of person authorized to sign) | | BY (Signature of Contracting Officer) | 10-Jun-2004 |

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

**The following items are applicable to this modification:**

Item 13. ADDITIONAL SOLICITATION REQUIREMENTS on SF 1442 should read, "Sealed offers in original and 1 copies to perform the work required are due . . ."

Section 00010 Solicitation Contract Form for pricing adds the following pricing explanation:

As required per Section 00010 of the solicitation, the price/cost associated with the prototypical project shall be inserted herein. Separate price/costs shall be inserted for design and construction. No actual construction documents shall be prepared as part of this solicitation, rather the price/costs of preparing these documents shall be included in the amount proposed for design.

Page 48 Section 2.2.2 USE OF REFERENCE IDENTIFICATION FORMS Offerors shall identify in Part 2 the following on separate "Reference Identification Forms," Exhibit D, ALL businesses and Federal, State or Local Government agencies for whom the offeror has been awarded a contract during the past three (3) years for the period beginning 3 years back from the solicitation release date. If an offeror has more than 10 awarded contracts during the past 3-year period, then identify only 10 consecutive awarded contracts. ALSO, include a "Subcontract Consent Form," Exhibit C sheet for each contract discussed in accordance with paragraph 2.2.1 The exhibit C sheets do not count toward the volume page count. Title pages do not count toward the volume page count. If the offeror does not have government references, the offeror should provide references from private industry sources that are not prohibited from furnishing information to the Governmnet. The information must provide a point of contact at each of these agencies or business organizations.

Page 57 2.1.3.5 Scheduling Methodology should read ". . . Contractor demonstrates and understanding of the scheduling requirements of the RFP, as stated in Section 01340 Project Schedule. . . ."

Section 00800 – Special Contract Requirements

21. PERIODS changes the minimum guarantee amount from $100,000.00 to $20,000.00 per award.

Section 00800, paragraphs, Special Contract Requirements: Remove reference to 13.2.1.7.1.

SCOPE OF WORK

DOE MATOC
Amendment 0001
Last Update: 8 June 04

- SOW, pg 6

Below the first paragraph under PERFORMANCE REQUIREMENTS, add the following paragraph:

**COMMENCEMENT, PROSECTION, AND COMPLETION OF WORK**

**Should the prototypical project be executed, the Contractor shall be required to (a ) commence work under this task order within 10 calendar days after the date the Contractor receives the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than 365 days following receipt of the notice to proceed.**

- SOW, pg 8, ENGINEERING AND TECHNOLOGY DISCIPLINES REQUIRED

Replace with:

This is a design-build project. The contractor shall be responsible to provide all designs required to construct the facility in accordance with the International Design and Building codes and any local regulations imposed by BWXT Y-12 **including the Engineering Interface Document**. BWXT Y-12 Engineering will provide design support including electronic copies of existing facility drawings, review of the design, and as-built of drawings.

- SOW, pg 8, Summary of Facility Requirements

Replace with:

**Service Bays**

**Five double bay service areas approximately 28’ by 35’ will be provided for heavy equipment repair. These service bays will be accessed by five double bay entrance doors approximately 24’ by 14’ high.**

**Two drive through, double bay service areas approximately 32’ by 70’ will be provided for passenger vehicles. These service bays will be accessed by four double bay entrance doors approximately 28’ by 14’ high.**

**One drive through, single bay service area approximately 16’ by 70’ will be provided for passenger vehicles. This service area will be accessed by two single bay entrance doors approximately 12’ by 16’ high.**

**Four double bay service areas approximately 20’ by 35’ will be provided for forklifts. These service bays will be accessed by four double bay entrance doors approximately 18’ by 14’ high.**

**Special Facilities**

**One drive through, single bay general purpose lubrication and vehicle wash bay approximately 16’ by 70’ will be provided. This facility will be accessed by two 12’ by 14’ high entrance doors.**

**One drive through, double bay tire shop that is approximately 25’ by 70’ will be provided. This shop will have two 18’ by 14’ high access doors. This shop will include necessary tire storage racks.**

**One single bay machine shop and weld area approximately 16’ by 70’ shall be provided with appropriate ventilation requirements. A single 12’ by 14’ door will be provided.**

**Storage Facilities**

**An area approximately 35’ by 60’ will be provided as a small equipment repair and parts & oil storage facility. This facility will be designed to be secured with the stored items checked out through a single entrance way. A counter and roll-up door will be provided for the dispensing of parts and oil. Emergency egress doorways must be provided as required to meet applicable codes. The general maintenance parts and the new oil will be stored in this facility. Existing shelving from existing facilities will be relocated to the new facility. The used oil will be collected in a 1000 gallon tank to be relocated from the existing garage to an area outside the new oil lube bay.**

- SOW, pg 12, Attachment 1, Vehicle Maintenance Facility, Equipment List, “Lubrication Rack“ Table

Remove the Service Pit from this table.

- Replace attachment 2 with the following:

Attachment 2

Design Requirements

Section 1

TABLE OF CONTENTS

# SECTION 1

# DESIGN REQUIREMENTS

1. PROJECT DESCRIPTION. The project consists of the design and construction of the Phase II Replacement of Building 9712 Garage Facility at the Y-12 National Security Complex, Oak Ridge, Tennessee. The project consists of the design and construction of service bays, tire shop, and parts storage that will be attached to the new office structure currently under construction. The structure shall be designed and constructed to readily accommodate the transition from the existing service area in use to the newly constructed service bays with a minimal interruption to the ongoing required maintenance operations at Y-12.. A suggested floor plan for the new building is provided. The contractor may propose an alternate floor plan provided the intended function of the building is accommodated. Any alternate floor plan is subject to government review and approval by the Contracting Officer. The extent of interruption to operations of the ongoing service function must be accurately described and approved by the COR prior to any construction activities taking place.

2. DESIGN SUBMITTAL REQUIREMENTS. See Section 2, DESIGN AFTER AWARD.
Standards, Documents, and Criteria. The design requirements within Section 1 represent the minimum quality and quantity acceptable for the proposals and project submittals. The standards, documents, and criteria referenced within this solicitation, although not all attached within this solicitation document, are modified to the extent indicated within this section, and shall be the most current version. The contractor shall be responsible for obtaining any documents not attached as part of this solicitation but referenced as criteria for the project. Requirements of this section may delete, revise, add to, or substitute for criteria contained in the referenced documents and this section shall be deemed the controlling authority of any changes to the other referenced documents and criteria.

2.1 Design Standards. Equipment, hardware, and materials shall be standard manufactured items unless otherwise specified. Replacement parts shall be standard and readily available through commercial means. Discontinued products will not be accepted unless approved by the Contracting Officer. (Refer to the Engineering Interface Document)

2.2 Codes. The design, materials, equipment, and installation shall be in accordance with the requirements of the listed codes and design manuals, with the requirements of this section, and with the listed specifications. The building will be of a noncombustible construction classification. Wood structural elements will not be acceptable. (Refer to the Engineering Interface Document)

2.3 Drawings. The attached drawing provides information on the site and general building layout, and shall be used in the design of the facility.

2.4 Field Information. The information provided in the drawings is the best information available. It is provided to assist the Contractor during the design of this project. The Contractor is responsible for field verifying all information given. The Contractor is also responsible for obtaining all information necessary to properly design and install all work. Gathering information during design shall be coordinated through the Contracting Officer. Any survey requiring utility locations, manhole inverts, verification of existing features, etc. shall be the responsibility of the Contractor and shall tie into the project datum.

2.5 Design Details and Standards. The Contractor shall provide a design and construction package using the design details given or referenced in this solicitation. Additional details shall be created by the Contractor as required, but shall conform to the requirements of this solicitation and are subject to Government approval.

2.6 Specifications. Specifications shall be provided as part of the design package for this project. The Contractor shall provide a design and construction package consistent with the Construction Specifications Institute (CSI) referenced in this solicitation. If the Contractor uses specifications other than the CSI, the Contractor shall edit the specifications used to include all of the submittal, installation, and QC requirements given in the **CSI**. Specifications for items not identified in the guide specifications shall be written by the Contractor. The Contractor

shall edit the guide specifications, but edits shall conform to the specific minimum standard requirements of this solicitation and are subject to approval by the Government.

2.7 Demolition. Any demolition of existing facilities shall be detailed on the design drawings, described in the scope of work, and addressed in the specifications. All applicable environmental and disposal considerations shall be addressed.

3.0 ARCHITECTURAL DESIGN

3.1 Scope. The new service bay areas shall be constructed as shown in the detailed floor plan provided on the drawing, unless an alternate floor plan is approved. The contractor shall layout and install new telephone jacks, computer terminals, electrical outlets, environmental control systems, equipment support utilities etc. for the proper functioning of the service areas and parts storage.

3.1.1 Environmental control. The building shall be environmentally conditioned utilizing appropriate HVAC systems.

3.1.2 Electrical work. Each interior space shall be provided with all the necessary electrical components (lighting, power receptacles, switches, emergency notification speaker [ENS], plant intercom, HVAC power and controls, etc

3.1.3 The new building shall include a fire sprinkler system to provide proper coverage.

3.2 Applicable Standards. The latest edition of each referenced publication is to be used.

3.2.1 Y-12 National Security Complex Standards and Technical Specifications.

3.2.2 Standard Building Code

3.2.3 DOE-Std 1020-2002, which invokes the International Building Code (IBC) 2000 for seismic evaluations.

3.2.4 National Fire Protection Association (NFPA), NFPA 101, Life Safety Code

3.2.5 Standard Mechanical Code

3.2.6 Standard Plumbing Code

3.2.7 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Standards

3.2.8 American Society of Mechanical Engineers (ASME) Standards

3.2.9 Code of Federal Regulations (CFR)10 CFR 434 Federal Commercial Building Energy Code

3.2.10 NFPA 70, National Electrical Code, 2002

3.2.11 National Electrical Safety Code (NESC), 2002

3.2.12 National Fire Protection Association (NFPA) Standards

3.2.13 ANSI/CABO A117.1 ADA Accessibility Guidelines for Buildings and Facilities.

3.3 Barrier Free Design. The ground floor entry doors, restrooms, and the site area contained within the limits of this project shall be fully accessible to all handicapped individuals in accordance with the requirements of the Americans with Disabilities Act (ADA).

3.4 Life Safety. The facility shall be designed to meet or exceed the minimum construction and life safety standards as specified by the International Building Code (IBC). The minimum allowable construction type for all buildings shall be Type II, non-combustible construction. Requirements for the fire resistance of door, wall, ceiling and floor assemblies shall be in accordance with the International Building Code (IBC).

3.5 Fire Protection. In addition to the sprinkler system, the contractor shall furnish and install portable fire extinguishers in recessed extinguisher cabinets located as specified in NFPA 10 Fire Extinguishers.

3.6 Energy Conscious Design. Energy conservation design shall be in accordance with CFR 434 Federal Commercial Building Energy Code. Thermal insulation shall be provided in accordance with the mechanical design requirements.

3.7 Acoustical Design. Walls between private offices and walls between offices and the garage area shall have a Sound Transmission Class (STC) of at least 45. Door openings are not required to be sound rated. Utility outlets and ductwork penetrations shall not compromise the acoustical integrity of the wall, floor or ceiling assembly.

3.8 Interior Design. Interior design services include the selection of materials, colors and textures of all interior and exterior finish materials.

3.9 Building Systems, Materials, and Equipment. The proposed building systems and equipment shall be in accordance with the requirements of this section. The Government desires low or no maintenance finish materials to the greatest extent possible.

3.10 Roof System. The proposed roof system shall be a standing seam metal roof with a 2.5 foot vertical on 12 foot horizontal pitch.

3.11 Exterior Wall Finishings. The proposed exterior walls shall be finished with standard prefabricated metal siding to match the garage office currently under construction.

3.12 Metals.

3.12.1 Factory Finished Metals. Anodized aluminum finishes shall be AA-M12 C22 A42, minimum 0.7 mils, Class I, per Aluminum Association Designation System. All miscellaneous prefabricated components, such as fire extinguisher cabinets, shall be specified to have factory applied finishes in colors to coordinate with the facility. All miscellaneous ferrous metal items exposed to view, which do not have a factory finish, shall be primed and painted. Louvers shall have insect screens.

3.13 Wood. Wood in direct contact with concrete or roofing materials shall be pressure treated.

3.14 Built-in Cabinets.

3.15 Thermal and Moisture Protection.

3.15.1 Building insulation is variable for individual assembly options and will be governed by U-value requirements of the mechanical design requirements.

3.15.2 Caulking and sealants shall be specified for all joints, openings, and penetrations. Fire-stopping shall be specified for all fire rated partitions.

3.16 Doors.

3.16.1 Exterior entry doors shall be flush type with vision lites in the doors or sidelites; inner vestibule doors may be full glass type, exterior doors to mechanical and electrical rooms shall be flush type with louvers as required. All exterior hollow metal door and frame assemblies shall be constructed as required by ANSI/SDI-100 to meet or exceed an extra heavy duty, grade III, seamless-hollow steel construction, and shall be constructed with flush end closures at the top and flush closures or recessed channels at the bottom. All exterior single door openings shall be a minimum of 3'-0" wide by 7'-0" high and shall be insulated with foamed-in-place polyurethane.

3.16.2 Interior doors. All interior hollow metal door and frame assemblies leading to interior rooms shall be flush and constructed as required by ANSI/SDI-100 to meet or exceed a heavy duty, grade II seamless-hollow steel construction. Doors to offices shall be provided with vision panels. Fire rated door assemblies shall be in accordance with NFPA 80 Fire Doors and Windows.

3.16.3 Door Hardware. Door hardware shall be specified to conform to the minimum requirements and allowable options within American National Standards for Builders Hardware.

3.16.3.1 Locksets and Latchsets. Exterior entry doors shall have deadbolt locks. Locksets and latch sets shall comply with ANSI A156.2, Grade 1. All locksets shall be by BEST LOCK CORPORATION, or equal and compatible with the existing keying system. Locksets shall be provided with 7 pin removable cores. The contractor shall provide construction cores. Provide lever handles for all exterior and interior doors with the exception of mechanical, communication and electrical rooms.

3.16.3.2 Finishes and Materials. Architectural builder's hardware materials shall be as per ANSI A-156.18 and the finishes shall be specified to match existing, otherwise lockset finish shall be brushed chrome.

3.16.4 Door Accessories. All exterior doors shall be fully weatherstripped and include metal kick plates and heavy-duty metal thresholds. Provide door bumpers for all doors. Door closers, where required, shall be in accordance with ANSI A156.4 and NFPA 80 Fire Doors and Windows.

3.16.5 Master Keys. Master keying and individual room keying requirements shall be in accordance with the instructions provided by the facility users at the required pre-delivery conference.

3.17 Windows shall be a manufacturer's standard thermal break type, double-glazed product whose thermal performance complies with the U.S. Department of Energy, Energy Star Window Program for the Southern Climate Zone. Frames shall be aluminum, and shall have a minimum performance rating of F-AW65 per AAMA 101. Natural lighting is desirable and skylight windows will be a part of the design.

3.17.1 Glazing. Glazed insulating units for all exterior windows shall be double-paned, fixed, sealed, and shall have an outboard lite of clear float glass with a minimum 1/2-inch thick air space, and a clear inboard lite of a minimum 1/4-inch thick annealed laminated glass with a Low E coating. The outboard lite shall be safety or tempered glazing where required by safety requirements.

3.18 Flooring Finishes.

3.18.1 Sheet vinyl shall be specified for all administrative areas, including lunchrooms and hallways.

3.18.2 Exposed Concrete such as in mechanical/electrical rooms shall receive a clear sealer. Garage floors will receive a float finish according to approved specifications, no high strength topcoating is required.

3.19 Interior Wall Systems and Finishes.

3.19.1 All service and storage areas shall be specified to conform to the minimum requirements and allowable system options within UL fire and sound rated tested assemblies where required. No interior wall finishing will be necessary beyond interior insulation layers except in those areas where insulation is subject to be damaged by normal operations.

3.19.2 Paint systems. New walls shall receive one prime coat and two finish coats of proprietary paint coatings.

3.19.3 Edge Guards. Provide standard vinyl clad edge (corner) guards at all exterior wall corners of gypsum board walls. Top of edge guards shall be a minimum of 6'-0" (1.8 m) above finished floor. Bottom of guard shall be to floor in areas of no base and to top of base at all other areas. Exposed masonry wall outside corners shall be constructed with a manufacturer’s standard bull nose units.

3.20 Ceilings.

3.20.1 Service areas ceiling system No suspended ceilings are required by user. Access shall be provided to all valves. .

3.21 Specialties.

3.21.1 Communication specialties required shall be permanently attached to the walls.

3.21.2 Fire Extinguishers and Cabinets. Furnish and install fire extinguishers and 24-1/2”H x 7”D x 8-1/2”W recessed fire extinguisher cabinets as required by NFPA 10, Portable Extinguishers.

3.21.3 Signage. Provide signage in accordance with Y-12 Complex standards.

# 4. MECHANICAL DESIGN

## 4.1 Heating, Ventilating, and Air Conditioning.

### 4.1.1 Criteria Sources and References.

a. Air Force Handbook(I) 32-1163, Engineering Weather Data.

b. Standard Building Code (SBC), 2000.

c. Standard Mechanical Code (SMC), 2000.

d. Unified Federal Guide Specifications (UFGS).

e. DOE Technical Manuals.

(1) DOE STD 1020-2002, Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities.

g. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE).

(1) Fundamentals Handbook, 2001.

(2) HVAC Systems and Equipment Handbook, 2000.

(3) Applications Handbook, 1999.

(4) ASHRAE Standard 62, 1999.

(5) ASHRAE Standard 70, 1991.

(6) ASHRAE Standard 90.1, 1999.

h. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA).

(1) NFPA 90A, Installation of Air Conditioning and Ventilating Systems, latest edition.

4.1.2 Load Calculations. Heat gain and loss calculations shall be, as a minimum, in accordance with the current edition of the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals. The cooling equipment shall be selected based on satisfying the sensible and latent calculated loads. Heating load calculations shall not consider lights or internal loads as supplementing the heating system. Design submissions of the building load calculation analysis shall include complete input and output data. Heating and cooling loads shall be calculated using the ASHRAE load calculation manual work sheets or the Trane Company, Trace 700 Program. Load calculations shall include the design parameters listed in the Site Criteria paragraph.

4.1.2.1 Equipment Release Data, Personnel, and Lighting Loads. The building occupancy to be used in the calculations shall be 10 hours a day. Lighting and equipment release data shall only be utilized for cooling calculations.

4.1.2.2 Site Criteria. Temperature conditions at Oak Ridge, Tennessee range from above $96^{o}$ F in July to below $6^{o}$ F in January. Summer relative humidity is approximately 52%.

| | |
|---|---|
| Project Location: | Oak Ridge, TN |
| Latitude: | $35.994^{o}$ N |

| | |
|---|---|
| Longitude: | 84.245° W |
| Elevation: | 955 ft (291 m) |
| Prevailing Wind Direction: | Out of W (Summer); Out of NE (Winter) |
| Prevailing Wind Mean Speed: | 6.8 mph (3.0 m/s) (Winter) |

4.1.2.3 Outside Design Temperature Requirements:

| | |
|---|---|
| Outside Summer: | 90° F (32° C) DB<br>74° F (23° C) WB |
| Outside Winter: | 18° F (-8°C) |

Air-Cooled Condenser Temperature = 93° F (34° C)

Maximum U values Btu/hr ft$^2$ F (W/m$^2$ K)

| | |
|---|---|
| Opaque Walls: | 0.151 (0.857) |
| Gross Walls: | 0.192 (1.090) |
| Roof Ceiling: | 0.063 (0.358) |
| Perimeter Loss Coefficient (F): | 0.950 (1.644) |

Degree Days 65° F (18.3° C) Base

| | |
|---|---|
| Cooling: | 1524 (847) |
| Heating: | 3946 (2192) |

4.1.2.4 Indoor Design Temperatures.

| | |
|---|---|
| Summer Indoor Design Dry Bulb Temperature: | 75° F (24° C) |
| Winter Indoor Design Dry Bulb Temperature: | 70° F (21° C) |
| Winter Indoor Night Setback Temperature: | 55° F (13° C) |

4.2 Heating, Ventilation, Air Conditioning (HVAC). HVAC systems shall be designed, installed, balanced, and adjusted to distribute heating and cooling to all areas of the facility. The HVAC system shall consist of a split-system heat pump. Split-system outdoor condensing/evaporator units shall be pad-mounted at ground level. The indoor blower/coil unit shall be located on an equipment pad in a mechanical closet.

4.2.1 Air Conditioning. All heat pump equipment shall consist of matched components, all by the same manufacturer. Split-system heat pumps shall be as specified in UFGS Section 15700A - UNITARY HEATING AND COOLING EQUIPMENT. Refrigerants used shall have an ozone depletion potential (ODP) of 0.05 or less. The split system heat pump unit shall contain, as a minimum, the following factory installed features:

1. High and low pressure compressor protection.
2. Liquid line dryer.
3. Hermetically sealed compressor with built-in overloads and locked rotor protection.
4. Liquid sub-cooling.
5. Compressor start and run capacitor/relay.
6. Anti-short-cycle timer.
7. Testing and charging refrigerant connections.

The indoor coil shall be provided with a liquid strainer, expansion device, pre-insulated housing, copper or aluminum coil, and insulated condensate drain pan. Total length of refrigeration piping to each unit shall not exceed 30 feet. Exposed refrigerant piping shall be insulated and installed with a PVC cover. All heat pump units shall deliver a Seasonal Energy Efficiency Rating (SEER) of not less than 11.0 BTUH per watt input and an Heating System Performance Factor (HSPF) of not less than 6.8 BTUH per watt input. In order to establish this rating, the Air

Conditioning and Refrigeration Institute (ARI) publication "Directory of Certified Unitary Air Conditioners", latest edition, shall be the sole determination.

4.2.2 Heating. The heating systems shall be split system heat pumps. Capacities shall conform to recommendations of the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) handbooks. Heating equipment shall be as specified in UFGS Section 15700A - UNITARY HEATING AND COOLING EQUIPMENT.

4.2.3 Thermostats. Thermostats for the heat pumps shall be multi-stage (2 stage heat, 1 stage cool), wall-mounted type, conforming to NEMA DC 3, Wall Mounted Room Thermostats. Thermostats shall have an operating range appropriate to the heating and cooling design temperature setpoints. A system selector switch and a fan-selector switch shall be provided integral with the thermostat. The fan-selector switch shall have "AUTO" and "ON" positions. System selector switch shall have "HEAT," "OFF," and "COOL" positions. Maximum differential shall be $4^{o}$ F. Thermostats utilizing mercury switches are prohibited. Caution shall be taken not to install thermostats in the center of a wall or in a location that would interfere with furniture placement, or on an exterior wall. Thermostats shall not be located in locations subject to unrepresentative temperatures, such as locations opposite bathroom doors, laundry room doors, or exterior doors. Thermostats shall be installed at 5'-0" above the finished floor.

4.2.4 Condensate Drains. Condensate drain lines (3/4" minimum) from cooling coils and furnaces shall be piped directly to a floor sink located in the mechanical closet or routed directly outside. Piping shall not run under concrete slabs or over floor slabs. The runs shall be straight as possible with a minimum of turns to prevent clogging.

4.2.5 Ventilation System. The building shall be provided ventilation in accordance with ASHRAE 62-1999 based on occupancy and/or type of space. Air distribution systems shall be designed to insure that minimum outside air requirements are provided to the building year around. Infiltration shall not be considered as supplementing the ventilation requirement.

4.2.5.1 Exhaust Systems. Exhaust vents shall not be located near outdoor air intakes to prevent short circuiting of exhaust air. Roof mounted exhaust fans are prohibited.

4.2.5.2 Equipment. All materials and equipment shall be the standard cataloged product of manufacturers regularly engaged in production of such materials and equipment, and shall be the manufacturer's latest standard design. Equipment shall comply with the requirements of Underwriters Laboratories, Inc. (UL), American Gas Association (AGA), Air Conditioning and Refrigeration Institute (ARI), American Society for Testing and Materials (ASTM), National Electric Manufacturers Association (NEMA), American National Standards Institute (ANSI), National Fire Protection Association (NFPA) or other national trade associations as applicable. Equipment selection and layout shall make provisions to observe the manufacturer's recommended clearances and code clearances. Rooftop equipment shall not be used in this facility.

4.2.5.3 Louvers. Louvers shall be constructed of extruded aluminum and shall have an anodized factory finished as required to match the architectural features of the building. All louvers shall have a nominal wall thickness of 0.125” (3.2 mm) minimum and shall be provided with the manufacturer’s standard security bars (located on the inside of the louver). Combustion air louvers shall be sized in accordance with NFPA 54. Louvers located in mechanical room doors are not permitted. All louvers shall be sized to limit the face velocities to a maximum of 700 fpm (3.56 m/s) exhaust, or 500 fpm (2.54 m/s) air intake. Louver sizes shall be coordinated with Architectural and Structural disciplines. All louvers shall utilize bird screens. Bird screens shall be constructed of flattened aluminum or galvanized steel and shall have a nominal thickness of 0.063” (1.6 mm) minimum. Provide louver sizes and free area requirements on the contract drawings.

4.2.5.4 Access Panels. Access panels/doors shall be provided as required for valves and appurtenances of the HVAC system in accordance with CSI Specifications.

4.2.5.5 Duct System Design. The ductwork shall be sized using the equal friction design method as specified in SMACNA HVAC Systems Duct Design Manual. Duct locations shall be coordinated with all disciplines. All ductwork shall be galvanized sheet metal and shall be as specified in CSI Specification. Flexible duct run outs shall be insulated metallic and shall be limited to 5 ft (1.5 m) in total length. Noise levels from hvac systems shall be

designed in accordance with the requirements indicated in the ASHRAE HVAC Applications Handbook, chapter entitled Sound and Vibration Control.

The ductwork shall be insulated in accordance with CSI Specification. Ductwork, ductwork openings, and plenums shall be designed to a maximum NC of 35. Duct and air distribution devices shall meet the velocity requirement indicated in the ASHRAE Handbook.

4.2.5.6 Volume Dampers. Manual balancing dampers shall be furnished with accessible operating mechanisms. Where operators occur in finished portions of the building, operators shall be chromium plated with all exposed edges rounded. Manual volume control dampers shall be operated by locking-type quadrant operators. Dampers shall be 2 gauges heavier than the duct in which installed. Unless otherwise indicated, multi-leaf dampers shall be opposed blade type with maximum blade width of 12 inches (300 mm). Access doors or panels shall be provided for all concealed damper operators and locking set screws. Unless otherwise indicated, the locking-type quadrant operators for dampers, when installed on ducts to be thermally insulated, shall be provided with stand-off mounting brackets, bases, or adapters to provide clearance between the duct surface and the operator not less than the thickness of the insulation. Stand-off mounting items shall be integral with the operator or standard accessory of the damper manufacturer. Volume dampers shall be provided on all supply ducts to diffusers, outside air, return, and exhaust ducts to ensure proper balancing and mixing within the system. Dampers integral with registers or diffusers will not be considered volume dampers for the purpose of balancing.

4.2.5.7 Diffusers, Grilles and Registers. Air distribution devices shall be factory-fabricated of steel, corrosion-resistant steel, or aluminum and shall distribute the specified quantity of air evenly over space intended without causing noticeable drafts, air movement faster than 50 fpm (0.25 m/s) in occupied zone, or dead spots anywhere in the conditioned area. Inlets and outlets shall be sound rated and certified according to ASHRAE 70. Diffusers and registers shall be as specified in CSI Specification and shall be color coordinated with the Architectural design.

4.2.5.8 Insulation. All piping (aboveground and belowground), ductwork (supply and relief), and other applicable equipment shall be insulated. Insulation shall be in accordance with CSI Specification.

4.2.5.9 Vibration and Noise Isolation. All piping, ductwork, air handlers, unit heater and equipment shall be properly isolated to prevent vibration and subsequent noise limited to 10% transmission of the lowest equipment RPM.

4.2.5.10 Seismic Design Requirements. Seismic design shall be in accordance with CSI Specification.

4.2.5.11 Control System. The contractor shall be responsible for correct operation of the control system including, but not limited to, software, control relays, sensors, and control wiring.

4.2.5.12 Testing, Adjusting, and Balancing. Testing, adjusting, and balancing shall be in accordance with CSI Specification.

4.2.5.13 Commissioning of HVAC Systems. Commissioning of HVAC and Control systems shall be in accordance with CSI Specification.

4.2.6 Calculations to be Provided. Calculations shall be provided as specified in this section and as required in Section 2.

4.3 Plumbing.

4.3.1 Requirements, Criteria Sources and References.

a. Standard Plumbing Code, 2000.

b. American National Standards Institute (ANSI)

ANSI B16.3 Malleable Iron Threaded Fittings, Classes 150 and 300.

c. AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

(1) ASME A112.19.1M (1994) Enameled Cast Iron Plumbing Fixtures

(2) ASME A112.19.2M (1990) Vitreous China Plumbing Fixtures

d. NFPA 54, National Fuel Gas Code.

e. Architectural and Engineering Instruction Manual, Southwestern Division, U.S. Army Corps of Engineers (SWD AEIM), latest edition.

f. PLUMBING AND DRAINAGE INSTITUTE (PDI)

PDI WH 201, Water Hammer Arresters, latest edition.

g. Construction Specification Institute (CSI).

4.3.2 Functional and Technical Requirements.

4.3.2.1 Equipment and Materials. All materials and equipment shall be the standard cataloged product of manufacturers regularly engaged in production of such materials and equipment, and shall be the manufacturer's latest standard design. Equipment shall comply with the requirements of Underwriters Laboratories, Inc. (UL), American Gas Association (AGA), Air Conditioning and Refrigeration Institute (ARI), American Society for Testing and Materials (ASTM), National Electric Manufacturers Association (NEMA), American National Standards Institute (ANSI), National Fire Protection Association (NFPA) or other national trade associations as applicable. Equipment selection and layout shall make provision to observe the manufacturers recommended clearances and code clearances.

4.3.2.2 Access Panels. Access panels/doors shall be provided as required for valves and appurtenances of the plumbing system in accordance with CSI Specification.

4.3.2.3 Plumbing Fixtures. All plumbing fixtures shall be ADA compliant.

The plumbing fixtures shall be as follows and as specified in CSI Specification.

f. Electric Water Coolers (EWC's) - Self contained. Exposed surfaces shall be stainless steel. EWC's shall be handicapped accessible and wall mounted at an accessible height. One electric water cooler shall be provided for each 75 occupants or fraction and at least one per floor. EWC's shall use one of the halogenated hydrocarbons with an ozone depletion potential of less than or equal to 0.05.

4.3.2.4 Plumbing Faucets and Fittings. All plumbing faucets and fixtures will be the standard catalogued products of manufacturers regularly engaged in the production of such items. Materials and equipment shall be the manufacturers' latest standard design. Faucets, fixtures and fixture trim shall be provided complete with fittings. Faucet and fixture trim shall be chromium plated or nickel plated brass with a polished bright or satin surface. Faucets shall be single control type with one handle, which will regulate volume and temperature. Seals and seats of single control faucets

shall be combined in one replaceable cartridge designed to be interchangeable with all lavatories, and kitchen sinks. Traps for lavatories and sinks shall be chromium plated brass, 20 gauge minimum. Trim for plumbing fixtures shall not have alloys exceeding 16 percent zinc. Aluminum trim shall not be permitted.

4.3.2.5 Valves. All plumbing fixture valves shall be UL or FM approved and shall be provided in accordance with the UFGS Section 15400A - PLUMBING, GENERAL PURPOSE. Valves shall be provided on supplies to equipment and fixtures. Valves 2 1/2" (65 mm) and smaller shall be chrome plated bronze with threaded bodies for pipe and solder-type connections for tubing. Valves 3" (80 mm) and larger shall have flanged iron bodies and bronze trim. Pressure ratings shall be based upon the application.

4.3.3 Domestic Water Supply. The domestic cold and hot water piping systems shall be sized for a maximum flow velocity of 4 feet per second. The supply line to each item of equipment or fixture, except faucets, flush valves, or other control valves that are supplied with integral stops, shall be equipped with a shutoff valve to enable isolation of the item for repair and maintenance without interfering with operation of other equipment or fixtures. Supply piping to fixtures, faucets, hydrants, and flushing devices shall be anchored to prevent movement.

4.3.3.1 Domestic Hot Water Requirements. Domestic hot water will be supplied from new electric water heaters.

4.3.3.2 Sanitary Sewer. All lavatory and sink drains and P-traps shall be coordinated with Architectural millwork to isolate drains. Sanitary sewer connections shall be designed in accordance with the Standard Plumbing Code.

4.3.3.3 Seismic Design. Seismic design shall be in accordance with CSI Specification.

4.3.4 Design Objectives and Provisions.

4.3.4.1 Supply, Drain, Waste, and Vent Piping Systems. All plastic vent and roof drain piping located in ceiling spaces which are used as return air plenums shall be insulated in accordance with CSI Specification. Any connections between dissimilar metallic piping systems shall be accomplished with dielectric isolation fittings. Supply, waste, and vent piping materials shall be as follows:

| Service | Above Ground | Below Ground |
|---|---|---|
| Supply | Copper Type L | Copper Type K |
| Drain | PVC/CPVC | PVC/CPVC |
| Waste | PVC/CPVC<br>Cast Iron<br>Copper Type L | PVC/CPVC |
| Vent | PVC/CPVC<br>Copper Type L | PVC/CPVC |
| Gas | Black Steel | Polyethylene |

4.3.4.2 Vibration/Noise Isolation. Water hammer arresters shall be used to minimize water system noise in accordance with PDI-WH 201. Velocities in domestic water piping shall be a maximum of 4 ft/s (1.2 m/s).

4.3.4.3 Insulation. All cold, hot and vent piping and other applicable domestic water equipment shall be insulated. Insulation shall be in accordance with CSI Specification.

4.3.5 Calculations Required. Calculations shall be provided as indicated in this section and as required in Section 2 of this solicitation.

4.4 Fire Suppression.

4.4.1 References. (All NFPA references specified shall be the latest available edition.)

a. NFPA 13 - Installation of Sprinkler Systems.
b. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
c. NFPA 72 - National Fire Alarm Code.
d. NFPA 101 - Life Safety Code.

4.4.2 General Requirements. The new building shall be equipped with a wet pipe sprinkler system in accordance with the requirements of NFPA 13 and as specified herein.

4.4.3 Occupancy Classification. The facility will contain multiple occupancy classifications as stipulated per NFPA 13. The facility will contain areas classified as Ordinary Hazard (Group 1).

4.4.4 Sprinkler Density Requirements. All Ordinary Hazard Group 1 Occupancy areas shall be provided with a sprinkler design density of 0.15 gpm/$ft^2$ (6.1 liters/minute per square meter).

4.4.5 Design Area. The sprinkler system design for each respective occupancy shall be hydraulically calculated to protect a minimum floor area of 1500 sq. ft. (139 square meters) or the actual floor area contained within the respective occupancy (contiguous floor area), whichever is less. A sufficient number of hydraulic calculation runs for each occupancy shall be provided in order to prove the hydraulically most demanding areas.

4.4.6 Hose Demand. A 500-gpm exterior hose demand shall be included in the hydraulic calculations. The demand shall be assumed to occur at a fire hydrant located nearest to the building's sprinkler service line point-of-connection to the water distribution system.

4.4.7 Water Supply. Building 9712 currently has a wet pipe fire sprinkler system. This system is supplied from the site water supply system. The system water pressure is sufficient to provide adequate sprinkler coverage without a fire pump system. The contractor shall coordinate with the site fire protection engineering group to determine the actual water pressures available.

4.4.8 Specific Requirements.

4.4.8.1 Equipment Requirements. All equipment, piping, etc., shall meet the requirements of CSI Specification and as specified herein. All equipment, piping, etc., shall be UL Listed and/or FM Approved for fire protection service; all system components shall be designed for a working pressure of not less than 1200 kPa (175 psi) unless otherwise indicated.

4.4.8.2 Sprinkler pipe shall be black steel pipe as permitted by NFPA 13. Screwed pipe shall be Schedule 40 or shall be listed by Underwriters' Laboratories to have a corrosion resistance ratio (CRR) of 1.0 or greater after threads are cut.

4.4.8.3 Pipe reducers shall be made with one-piece tapered reducing fittings. Grooved-end or rubber-gasketed reducing couplings are not allowed for use.

4.4.8.4 Sprinklers shall be used in accordance with their listed spacing limitations. Temperature classification shall be ordinary or intermediate as required. Sprinklers in high heat areas or in close proximity to unit heaters shall have a temperature classification in accordance with NFPA 13. Sprinklers in laboratories (and associated process work areas) and the Coating Facility shall be intermediate temperature rated unless a higher temperature rating is required per NFPA 13. Sprinklers in non-air conditioned spaces such as equipment rooms, etc., shall be intermediate temperature rated unless a higher temperature rating is required per NFPA 13.

4.4.8.5 All sprinklers shall be quick response type. Pendant sprinklers shall be either recessed or concealed type. Pendant sprinklers shall have a polished chrome or white enamel finish. No mixing of head types, including finishes is allowed.

4.4.8.6 If necessary for use, sidewall sprinklers shall be specifically listed for use in the respective hazard occupancy protected. Sidewall sprinklers shall have a polished chrome or white enamel finish.

4.4.9 Installation Requirements.

4.4.9.1 Any new piping in the sprinkler system shall be seismically protected. Seismic protection shall include flexible couplings, sway bracing, seismic separation assemblies where piping crosses building seismic separation joints, and other features as required per NFPA 13 for protection of piping against damage from earthquakes. Branch lines shall also be equipped with sway braces at the end sprinkler head and at intervals not exceeding 9 m (30 ft) (exception: when pipe support hangars are less than 6” long).

4.4.9.2 Auxiliary drains shall be provided where required by NFPA 13. Drain valves shall be used where drain plugs are otherwise permitted by NFPA 13. Where branch lines terminate at low points and form trapped sections, such branch lines shall be connected to a common drain line and routed to an auxiliary drain.

## 5. ELECTRICAL DESIGN

### 5.1 Electrical Systems.

5.1.1 General Scope. All electrical systems, including complete designs and installations as required below for the new building shall be provided as part of this project. For discussions on project scope see the Architectural and other sections within this document. All electrical designs and installations shall be as required here and elsewhere in this document.

5.1.2 Coordination. Electrical work shall be coordinated through the Contracting Officer's Representative.

5.1.3 Digging Permits. Digging permits, for any exterior work, shall be obtained prior to performing any excavations.

5.1.4 Design and Calculations Review. The Contractor shall have the design and calculations reviewed by a separate Professional Engineer not associated with the original design. Required calculations are as follows:

Load and demand calculations.
Lighting calculations for each room.
Short circuit calculations.
Voltage drop calculations.
Load and load factors, including allowance for future loads.
Fault current and ampere interrupting capacity (AIC).
Cable pulling calculations for any exterior underground cable pulls over 500 ft. in length.

5.1.5 Exterior Electrical System. The Contractor shall provide and install exterior electrical systems as described herein.

5.1.6 Interior Electrical System. The Contractor shall provide and install complete interior electrical systems for the new building. All Contractor installed equipment requiring power shall be connected. All Owner-furnished, Contractor-installed equipment including modular furniture power requirements shall be coordinated prior to any rough-ins.

5.1.7 Commercial Codes and Design Manuals. Design and installation shall conform to the latest editions of the references listed below, unless otherwise indicated herein.

a. Americans with Disabilities Act (ADA) Accessibility Guidelines.

b. ANSI C2, National Electrical Safety Code.

c. ANSI C57.12.00, General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers.

d. ANSI C57.12.26 Requirements for Pad-Mounted, Compartmental-Type, Self-Cooled, Three-Phase Distribution Transformers for use with Separable Insulated High-Voltage Connectors, High-Voltage, 34500GrdY/19920 Volts and Below; 2500 kVA and Smaller.

e. ANSI C57.12.27 Conformance Requirements for Liquid-Filled Distribution Transformers Used in Pad-Mounted Installations, Including Unit Substations.

f. ANSI C57.12.28 Switchgear and Transformers - Pad-Mounted Equipment - Enclosure Integrity.

g. ANSI C84.1, Electric Power Systems and Equipment - Voltage Ratings.

h. ANSI A117.1, Buildings and Facilities - Providing Accessibility and Usability for Physically Handicapped People.

i. ANSI/IEEE Std. 141, Recommended Practice for Electric Power Distribution for Industrial Plants. (The Red book.).

j. ANSI/IEEE Std. 142, Recommended Practice for Grounding of Industrial and Commercial Power Systems. (The Green Book.).

k. ANSI/IEEE Std. 242, Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems. (The Buff book.).

l. ANSI/ASME A17.1, Safety Code for Elevators and Escalators.

m. EIA 568, Commercial Building Telecommunications Wiring Standard.

n. EIA 569, Commercial Building Standard for Telecommunications Pathways and Spaces.

o. EIA 607, Grounding and Bonding Requirements for the Telecommunications Infrastructure of Commercial Buildings.

p. IES, Lighting Handbook, Reference and Application.

q. NFPA 70, National Electrical Code.

r. NFPA 72, National Fire Alarm Code.

s. NFPA 75, Electronic Computer/Data Processing Equipment.

t. NFPA 90A, Air Conditioning and Ventilating Systems.

u. NFPA 101, Life Safety Code.

v. NFPA 780, Lightning Protection Systems.

w. Uniform Federal Accessibility Standards.

x. UL 268, Smoke Detectors for Fire Protective Signaling Systems.

y. Y-12/BWXT, Design and Construction Standards (all).

z. US Army Corps of Engineers Standard Detail(s) 40-06-04, Lighting Fixtures, as published on the internet ("www.hnd.usace.army.mil/techinfo/fixtdwg.htm").

aa. IEEE C62.41 (1991) Surge Voltage in Low Voltage AC Power Circuits.

bb. NACE RP0169 (1996) Control of External Corrosion on Underground or Submerged Metallic Piping Systems.

cc. NACE RP0177 (1995) Mitigation of Alternating Current and Lightning Effects on Metallic Piping Systems.

dd. NACE RP0190 (1995) External Protective Coatings for Joints, Fittings, and Valves on Metallic Underground or Submerged Pipelines and Piping Systems.

ee. DOE Technical Manuals.

(1) DOE STD 1020-2002, Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities.

5.2 Exterior Electrical.

5.2.1 Scope.

5.2.1.1 Power. The contractor shall perform a load study on the existing building electrical systems and on the projected loads for the new building. If the load study determines that the existing building power supply is not adequate to support the combined projected loads, the contractor shall propose upgrades to the existing building electrical service, which will provide adequate electrical service for the new building projected loads, or the contractor shall determine in coordination with BWXT additional electrical service requirements separate from the existing service. All electrical service and exterior electrical equipment shall be designed and installed per the Y-12/BWXT exterior electrical standards.

5.2.1.2 Communications. Exterior communications lines necessary to support the new building shall be provided as part of this project. Exterior communication lines shall consist of telephone, LAN, and emergency notification system connections. Exterior cables (copper and fiber optic) shall be provided as necessary to connect the interior systems being installed into the existing exterior systems. Exterior cables shall be installed to the nearest point of connection (POC), which may be a manhole or OH cable connection/splice point. Determination of the location of the POC shall be coordinated through the Contracting Officer's Representative, and shall be negotiated with Y-12/BWXT exterior site electrical personnel. All exterior cables shall be designed and installed per the Y-12/BWXT exterior electrical standards. The final connections/splices into the existing exterior systems shall be performed by Y-12/BWXT personnel.

5.2.2 General Requirements. The design, materials, equipment and installation shall be in accordance with the requirements of the listed codes and standards, and per the Y-12/BWXT standards.

5.2.2.1 Labeling. Where applicable, all materials, equipment, fixtures and appurtenances shall be labeled by Underwriters Laboratories, Inc., or a similar organization acceptable to the Government.

5.2.2.2 Routing and Location. The routing of the new underground feeders shall be approved by and coordinated with the Contracting Officer's Representative. Except for crossings, electrical and communications utilities shall not be located under streets or sidewalks.

5.2.2.3 Fault and Overcurrent Protection. Overcurrent and fault protection devices shall be coordinated with line-side and load-side fuses or circuit breakers to isolate any electrical fault or overload from the rest of the system. Some breaker sizes may not coordinate under some fault conditions; however, good engineering practices shall be used and devices shall coordinate for all overload conditions. The Contractor shall contact the Contracting Officer's Representative to obtain the information necessary to provide this coordination.

5.2.3 Miscellaneous.

5.2.3.1 Road Crossings. It shall be the responsibility of the Contractor to provide proper coordination and obtain all necessary permits, approvals, etc., before installing the crossings. Crossing ducts shall consist of reinforced concrete encased nonmetallic conduits.

5.2.3.2 Utility Crossings. Clearances from existing and new utilities (water, gas, sewer, etc.) shall be as specified in ANSI C2.

5.2.3.3 Underground Splices. Underground connections or splices shall not be permitted in primary or secondary conductors.

5.2.3.4 Demolition of Existing Exterior Electrical Systems. Demolition shall be required of any exterior systems being replaced.

5.2.3.5 Cathodic Protection. Cathodic protection shall be provided for all ferrous materials installed in contact with earth or installed below grade. Note: The following materials shall not be considered ferrous materials in contact

with earth; rebar installed in concrete, riserless anodes, and PVC coated RGS conduit. The cathodic protection shall be designed and provided in accordance with the methods and provisions and standards of NACE RP0169, NACE RP0177, NACE RP0190, and the Y-12/BMXT site standards.

5.3 Interior Electrical.

5.3.1 General. The Contractor shall provide complete electrical systems throughout the new areas.. Power, lighting, communications, and special systems connections and equipment shall be as required below.

5.3.1.1 Scope. In places where existing equipment is affected by construction of the new building (eg: electrical equipment located on a wall that is being moved), the existing equipment shall be relocated (or replaced) as necessary to accommodate the new building layout.

5.3.1.2 All installations, whether totally new or relocated, shall be as required by the National Electrical Code. The Contractor shall provide power to all equipment. The Contractor shall be responsible for coordinating between his sub-contractors for control power and shall provide control for all mechanical equipment.

5.3.1.3 Under Slab. No conduits, wires, cable, or equipment, except the main service entrance(s), shall be located under the building concrete slab.

5.3.1.4 Enclosure Covers. Enclosures shall have screws or screw clamps and shall have provision for locking with utility-type seals.

5.3.1.5 Fault and Overcurrent Protection. Overcurrent and fault protection devices shall be coordinated with line-side and load-side fuses or circuit breakers to isolate any electrical fault or overload from the rest of the system. Some breaker sizes may not coordinate under some fault conditions; however, good engineering practices shall be used and devices shall coordinate for all overload conditions. This includes coordination across transformers.

5.3.1.6 Labeling. All materials, equipment, fixtures and appurtenances shall be labeled by Underwriters Laboratories, Inc., or a similar acceptable organization.

5.3.1.7 Grounding. All circuits shall be equipped with a green ground no matter what type of load is connected or what type of conduit is used. The ground shall be connected to the panel grounding bus per the NEC.

5.3.2 Sizing Services and Feeders. Sizing calculations shall be provided in the format used in the current edition of the National Electrical code, Chapter 9, Part B, Examples. Estimated loads shall be included in the calculations for future and spare equipment, and all equipment listed in the subparagraphs of "Interior Electrical, Dedicated Circuits".

5.3.2.1 Panelboard Feeders. Panelboard feeders from the service shall be sized to supply the full load rating of the panel they serve. For instance, a panel with a 100 amp demand load shall be fed by 100 amp wire, minimum.

5.3.3 Panelboards. Secondary and local panelboards shall be sized for a minimum of 125% of the demand load they serve. They shall be fully rated for the available fault current, and furnished with main circuit breakers (unless the feed is from an upstream panel breaker, in which case they may have MLO), full sized bolt-on branch breakers, insulated neutral busses and bonded equipment grounding busses. Panelboards located in finished areas shall be recessed, with flush fronts and hinged doors. Panelboards shall be located near the loads they serve. Twenty-five percent of single pole spaces (minimum) shall be provided for spares. The Contractor shall provide and install printed labels, in the panelboard, for all installed circuits. Panelboard buses shall be copper, aluminum buses shall not be allowed. Contractor shall remove all references to aluminum buses from specifications.

5.3.4 Surge Protection. The Building power supply system shall be provided with a surge protection system. The system shall consist of surge protection packages and modules installed in or connected to all panelboards, switchboards, and switchgear. The surge protection packages shall consist of three levels of protection; 1.) The main panel level (for service entrance panels, MDPs, MCCs, switchgear, etc.) 2.) The secondary panel level (for

distribution panels, switchboards, etc.) 3.) The local panel level (local panelboards and power panels). One package of the appropriate size and level of protection shall be installed in all panels.

5.3.5 Load Separation. Panelboards, feeders, branch circuits, and receptacles which supply power for user computer and data processing loads shall be separately derived systems (a separate step down transformer). Data processing loads shall include, computers, servers, monitors, printers, and all other peripheral equipment associated with computer and data processing systems. All of these computer and data processing loads shall be separate and distinct from the panels, feeders, etc., which supply the HVAC, lighting and other non-computer type building loads.

5.3.6 Conductors. All conductors shall be copper, aluminum is not allowed and not smaller than #12 AWG. Conductors #10 and #12 shall be solid; conductors #8 and larger shall be stranded. All conductors shall be installed in metallic conduit. Nonmetallic electrical conduit (smurf tube) is not allowed. Wire types THW or THWN shall be used. Fixture whips shall be armored cable or conductors installed in metallic flex. Type NM wire is not acceptable.

5.3.7 Branch Circuits, Receptacles and Outlets. All general receptacle and lighting circuits shall be 20 Ampere circuits, minimum, fed by 20 Ampere circuit breakers, minimum. All branch circuits required by the National Electrical Code shall be provided. Receptacles on opposite sides of common walls shall be horizontally offset.

5.3.7.1 Separate Circuits. Lighting and receptacles shall be on separate branch circuits.

5.3.7.2 Outlets per Circuit. Receptacles which are for general use (ie: not installed for a specific defined load) shall be on circuits with a maximum of 6 duplex outlets, rated at 180VA, per circuit.

5.3.7.3 General Purpose Receptacles. General purpose receptacles shall be installed per the N.E.C. in hallways, equipment rooms, and other general use areas. In office spaces, work cubicles and desk or computer areas, provide a minimum of one (1) duplex receptacle per wall or per 12 linear feet of wall space (which ever provides more receptacles). In the breakroom, provide a dedicated receptacle (on a separate circuit) at each location where a microwave, refrigerator, or counter top heating/cooking unit may be installed. Where not otherwise specified, a minimum of one duplex general purpose receptacle shall be provided for every 25 ft. of wall space.

5.3.7.3.1 Receptacle Loading. General use receptacles which do not have specific loads defined shall be assigned a demand load of 180VA per duplex outlet.

5.3.7.4 Computer Loads. Circuits terminating in receptacles shall be provided for all user provided computer loads.

5.3.7.4.1 Computer Circuit Loading. Where computer type loads are to be supplied, the demand loading shall be as follows: 250VA per CPU, 150VA per monitor, 400VA per personal printer, and 750 VA per heavy printer. These workstation loads shall be assumed to be continuous loads and the load demand factor shall be 100%.

5.3.7.5 User Equipment Loads. Circuits shall be provided for all user connected equipment loads. Unless otherwise stated, these circuits shall be terminated in a standard receptacle or a surface mounted disconnect switch (which gives a place for future connections) as appropriate for each load, sized to match the defined load/circuit capacity, and located as close to the defined load location as possible.

5.3.7.5.1 User Equipment Demand. Where user equipment is defined, the connected load shall be as given. Where general use receptacles are required, the connected load shall be calculated at 180 VA per duplex receptacle. For both of the above cases the building demand load may calculated at 50% of the connected load, however, the branch circuit shall be sized for the connected load.

5.3.8 Interior Receptacles. Receptacles shall be NEMA ?), located along walls as required above for the loads, workstations, and by the NEC. Receptacles shall be specification grade or better. The Contractor shall coordinate with the Contracting Officer’s Representative for specific locations of receptacles. Each circuit shall be provided with its own neutral. The locations of all receptacles shall be approved by the Contracting Officer’s Representative.

5.3.8.1 Ground Fault Current Interrupting (GFI) Receptacles. GFI receptacles shall be provided as required by the NEC. However at least one GFI receptacle shall be located in each restroom and janitor's closet.

5.3.8.1.1 Ground Fault Protected Receptacles. Except as otherwise noted, receptacles which are required to have ground fault protection may either be fed by a ground fault interrupting circuit breaker or may be installed on the downstream side of a ground fault protected receptacle.

5.3.8.2 Mechanical and Electrical Room Receptacles. A general use receptacle (GFI protected) shall be located in the mechanical room and general use receptacle (GFI protected) shall be located in the electrical equipment room; both shall be mounted at 48" A.F.F.

5.3.8.3 Restrooms. Restrooms shall have a ground fault receptacle located adjacent to each pair of sink basins. Above-sink fixtures shall not have receptacles.

5.3.8.4 Telephone Backboard Receptacle. For new telephone backboards, three dedicated 20 ampere circuits servicing six fourplex receptacles shall be provided at the voice/data backboards and/or racks. Install No. 6 green insulated ground wire from the telephone equipment backboard to the building ground/counterpoise system.

5.3.8.5 Exterior Receptacles. Exterior duplex receptacles, 120 Volt, shall be provided every 100 ft. around the exterior of the building.

5.3.8.5.1 Exterior receptacles shall be GFI and shall have weatherproof "Taymac" type covers which are rated NEMA 3R with a plug cord attached.

5.3.9 Lightning Protection. Lightning Protection shall be provided for new building construction. The Lightning Protection System(s) shall be per the requirements given in the latest version of the NFPA 780.

5.3.10 Lighting. Ceiling mounted fixtures shall be provided for all rooms and hallways, walk-in closets and interior areas. Lighting control shall be from wall-mounted switches.

5.3.10.1 Fixtures and Lamps. All light fixtures, exit signs, egress light fixtures, etc., shall be heavy commercial grade or better. Energy efficient lighting shall be provided. Incandescent style fixtures shall be physically capable of accepting screw-in fluorescent replacement bulbs. Fluorescent fixtures shall have energy saving electronic ballasts. Lamps shall be high efficiency, reduced wattage. Corps of Engineers Standard Lighting Detail Drawings shall be used as the basis for selecting fixtures. The COE Standard Lighting Details can be found in electronic form, under the heading of Standard Drawing 40-06-04, on the internet, at "www.hnd.usace.army.mil/techinfo". These drawing details are available in both AutoCad and Microstation format. Standard parabolic troffer type fluorescent fixtures shall provide general lighting for all rooms throughout the building. Troffer type fixtures shall have 16 cells for 2 lamp fixtures, 24 cells for 3 lamp fixtures, 32 cells for 4 lamp fixtures, and shall be provided with 3” deep louvers (3” deep louvers shall be a full 3” deep). Hallways, break rooms, & etc. may use acrylic lens type fluorescent fixtures. Mechanical and electrical rooms may use utility type fluorescent fixtures. Accent and task lighting may use fluorescent down and wall-washer recessed type fixtures.

5.3.10.2 Egress and Emergency Lighting. Emergency and egress lighting shall be provided as required by NFPA 101. Ceiling mounted fluorescent light fixtures with built-in batteries are acceptable. Residential grade fixtures or fixtures not intended for emergency lighting are unacceptable and shall be rejected. Exit lights shall be LED type fixtures. A central inverter, UPS with 90 minute battery, type emergency lighting system may be used in place of emergency and exit lights with separate built-in batteries. In this case the central inverter system shall be UL listed for use as a Life Safety 101 power supply system.

5.3.10.3 Fixture Mounting. Fluorescent fixtures shall be mounted as required by the National Electrical Code. Toggle bolts shall not be used to secure fluorescent fixtures or any other fixture that is not box mountable.

5.3.10.4 Lighting Control. Control switches for general room lighting shall be located at room entrances. Rooms with more that one door shall have three or four-way switches. In order to provide more than one level of lighting, inner and outer ballasts and lamps of multiple ballast fixtures shall be switched separately. Fluorescent task and

wall washer fixtures shall be controlled with separate switches. Dimming controls and fixtures shall be provided where required below.

5.3.10.5 Lighting Levels. Minimum lighting levels shall be as follows.

| | |
|---|---|
| Storage Areas | 15 Ft. Candles. |
| Mech. & Elec. Rooms | 15 Ft. Candles. |
| Maintenance Areas | 50 Ft. Candles. |

5.3.10.8 Lighting Loads. Lighting loads shall be assumed to be continuous and the lighting load demand factor shall be 100% for all occupied areas. Demand factors for lighting in unoccupied areas may be assigned as appropriate.

5.3.11 Fire Alarm System. The building shall be provided with a complete and fully functional fire alarm system which meets all national code requirements and Y-12/BWXT specific site requirements.

5.3.12 Telephone System. The building shall be pre-wired with a complete telephone system. Flush outlets shall be provided for all rooms and workstations as required herein. Wiring shall be homerun style back to the main communication room. All telephone homeruns shall be concealed. Conductors, wiring method and method of termination shall be CAT-6, per TIA/EIA 568A or B, Rev B or the latest approved version of the ANSI/TIA/EIA standards.. The Contractor shall provide grounding equipment, service entrance equipment, all conductors and outlets throughout the building. The Contractor shall connect and terminate all wiring to the outlets at each location and to the punch down blocks on the backboards.

5.3.12.1 Requirements. Outlets and connects within the building shall be provided as follows: 1 duplex per desk or workspace, 2 duplex per occupant in walled offices.

5.3.12.2 Outlet Terminations. Telephone outlets shall be modular, RJ-45 type receptacles, rated for CAT-6 installation, per EIA 568A or B, Rev B or the latest approved version of the ANSI/TIA/EIA standards. Each outlet location shall be a duplex (two RJ-45) receptacle. In locations where LAN outlets are required, the telephone outlets (duplex RJ-45 outlets) shall be installed together with the required LAN outlets in a Quadruplex outlet. Telephone outlets shall be “keyed” differently from the LAN outlets so that they cannot be interchanged.

5.3.12.3 Wiring. Telephone system wiring shall be 4 twisted pair, #24 copper, rated for CAT-6. Interior wiring shall be installed in EMT, IMC, or RGS conduit, or a combination of conduit and cable tray. In all cases, a raceway, which will allow future cables to be installed or removed shall be installed throughout the full length of the communication cabling pathway. Cables for the telephone wiring system shall have an outside jacket which is white.

5.3.13 Data (LAN) Communications System. Data communications (LAN) systems shall be provided throughout the building. The network shall be installed as a complete system, including raceway systems, wire and cable, connections and termination devices and equipment racks. All cables installed shall be terminated. For each device or location listed here or below the Contractor shall install a duplex data/LAN port. The systems shall be provided with a performance warranty covering the entire system. Unless otherwise specified, the copper systems installation shall be a Category 6 system per EIA 568A or B, Rev B or the latest approved version of the ANSI/TIA/EIA standards.

5.3.13.1 LAN/Data System. The LAN/Data system shall consist of a LAN System Rack(s), patch panels, and concentrators (if necessary), LAN/Data system wiring in general communication raceways, and LAN/Data receptacles (system servers and computers will be by others). Cables for the LAN system shall be provided with a blue outside jacket.

5.3.13.2 Terminations. Copper LAN System outlets shall be modular, eight-position RJ-45 type receptacles, rated for CAT-6 installation, per EIA 568A or B, Rev B or the latest approved version of the ANSI/TIA/EIA standards. Each outlet location shall be a duplex installation, with two (2) RJ-45 receptacles. In locations where telephone outlets are required, the LAN/data outlets (duplex RJ-45 outlets) shall be installed together with the required

telephone receptacles in a Quadruplex outlet. Copper LAN outlets shall be “keyed” differently from the telephone outlets so that they cannot be interchanged.

5.3.13.3 Requirements. LAN Outlets and connects within the building shall be provided as follows: 1 duplex per desk or workspace, 2 duplex per occupant in walled offices.

5.3.13.4 Wiring. Copper LAN system wiring shall be 4 twisted pair, #24 copper, rated for CAT-6 or the latest approved version of the ANSI/TIA/EIA standards. MFO LAN system wiring shall be single fiber, multimode fiber optic cable. LAN system wiring shall be installed in a raceway system designed and installed for that purpose. See raceway requirements below. Copper LAN system conveyances (wire and/or conduit) may not cross SCIF boundaries

5.3.13.5 Raceway. Raceways for the Classified LAN system shall be dedicated conduit(s), complete and enclosed from LAN Rack to receptacle box. Raceways for the Non-classified LAN system(s) shall consist of a combination of conduit and cable tray, as described below.

5.3.13.5.1 Cable Tray. Cable tray systems shall be ladder type open tray systems for non-classified systems, and closed covered tray systems for classified systems, installed, in the above ceiling space. Telephone and non-classified LAN system cables may be combined in the same cable tray. BWXT/Y-12 will provide information on classified and non-classified systems.

5.3.13.5.2 Conduit. Conduits for the non-classified LAN system shall be installed from each termination point or connection device to the cable tray system in the above the ceiling space.

5.3.13.5.3 Comm./Server Rooms. All Comm./Server rooms shall be provided with suspended wireway above network frames and server racks to allow for cable routing.

5.3.13.6 Grounding and Bonding. LAN/Data Systems installations shall be grounded and bonded per EIA 607.

5.3.13.7 Testing. All LAN/Data system installations shall be tested for CAT-6 performance per EIA 568A or B, Rev B or the latest approved version of the ANSI/TIA/EIA standards.

5.3.13.8 Server Locations. In locations where servers are located (typically in server/comm. rooms), the contractor shall provide a floor mounted, free standing, 19 in. wide, 96 in. high, open frame server rack, in which the necessary patch panels and terminations shall be mounted.

5.3.14 PA/Emergency Notification System. Provide a stand alone PA/Emergency Notification system throughout the building. The PA/Emergency Notification System shall be compatible with and connected into existing systems in the area per instructions provided by BWXT/Y-12.

5.3.15 Motors. All motors installed, whether supplied separately or as part of an equipment package, shall be appropriately rated for the duty cycle and service conditions of the location and the application.

## 6. CIVIL DESIGN

### 6.1 References

**6.1.1 National Fuel Gas Code, NFPA 54-latest version.**

**6.1.2 Uniform Federal Accessibility Standards, Federal Register.**

**6.1.3 TM 5-822-2, July 1987, General Provisions and Geometric Design for Roads, Streets, Walks, and Open Storage Areas.**

**6.1.4 Manual of Uniform Traffic Control Devices, U.S. Department of Transportation, FHWA.**

**6.1.5 Military Handbook MIL-HDBK-1008C, 10 June 1997, Fire Protection for Facilities Engineering Design and Construction.**

**6.2 Pavement Marking. All parking spaces and pedestrian crosswalks shall be properly striped to define the parking spaces, crossing areas, and no-parking areas. Pavement marking shall be in accordance with CSI specifications.**

**6.3 Sidewalks and Curb and Gutter. Concrete for sidewalks and curb and gutter shall be standard concrete or accent, colored concrete in accordance with the CSI Specifications.**

**6.4 Curb and Gutter. Curb and gutter shall be provided for all parking areas, end islands and driveways.**

**6.5 Walks. Walks shall be provided to allow for pedestrian circulation to the various elements of the facility including the building, parking areas, etc. Walks shall be provided to all secondary entrances to the building as well as to the main entrances. Walks provided for access to the building shall be centered at the doorway they serve.**

**6.6 Handicapped Access. Ramps for the handicapped shall be provided for wheel chair access from the parking areas to the building. Ramps shall also be provided in the existing sidewalk where these sidewalks are crossed by the new driveways. The main entrances to the building, at a minimum, shall be accessible to the handicapped.**

**6.7 Grading. Care shall be taken to drain surface runoff away from the building to avoid saturating the soils which support the building foundation system.**

**7. STRUCTURAL DESIGN.**

**7.1 Description. The structural criteria established herein shall be used for structural loading, design and installation of all structural systems and foundations, including manufacturing, erection, supervision, testing, and quality assurance of the completed installation of this project. All structural calculations shall be checked and initialed as such by a registered structural engineer other than the original design engineer. The structural work consists of design and construction of but not necessarily limited to the following items.**

**a. Building Foundations.**
**b. Load Bearing and Non-Load Bearing Masonry Walls.**
**c. Non-Load Bearing and Soffit or Fascia Steel Stud Walls.**
**d. Vertical Framing Members.**
**e. Horizontal Framing Members, including roof and floor decks and diaphragms, and roof and floor framing members.**
**f. Connection details of structural materials.**
**g. Special conditions, such as expansion, construction, and contraction joints, changes in floor levels, and special structural consideration for filing lectrievers.**
**h. Attachment provisions for architectural, mechanical, and electrical elements.**
**i. Site screen and security walls and foundations.**
**j. Interior and exterior equipment pads.**
**k. Site concrete docking stations.**
**l. Site waste bin concrete pads.**

**7.2 References. Design methods and allowable stresses or load factors for the various structural materials shall be in accordance with current technical instructions (TI-), engineering regulations (ER-), engineering technical letters (ETL-) and codes and specifications (AISC, ACI, SJI, and etc.). The references used for the design and contract documents of this project shall be included in any design analysis required for this project. Edit out any reference that is not used on this project.**

**7.2.1 COE Engineering Manuals:**

**7.2.1.1 USACE TI 809-01 - Load Assumptions for Buildings (3 August 1998).**

**7.2.1.2 USACE TI 809-04 - Seismic Design For Buildings (31 December 1998).**

**7.2.1.3 AFM 88-3, Chapter 3 - Masonry Structural Design for Buildings (October 92).**

**7.2.1.4 USACE TI 809-07 - Design of Cold-Formed Load Bearing Steel Systems and Masonry Veneer/Steel Stud Walls (30 November 1998).**

**7.2.1.5 USACE TI 809-29 - Structural Considerations for Metal Roofs (3 August 1998). 01010-32**

**7.2.1.6 USACE TI 809-30 - Metal Building Systems (1 August 1998).**

**7.1.7 USACE TI 809-52 - Commentary on Snow Loads (3 August 1998).**

**7.2.1.8 ER 1110-345-53 - Structural Steel Connections (22 July 1994).**

**7.2.2 Codes and Specifications.**

**7.2.2.1 AISC-M018L - Load and Resistance Factor Design Specification for Structural Steel Buildings by American Institute of Steel Construction (AISC, Second Edition).**

**7.2.2.2 AISC-M019L - Load and Resistance Factor Design Specification, Volume II-Connections by American Institute of Steel Construction (AISC, Second Edition).**

**7.2.2.3 Building Code Requirements for Structural Concrete by the American Concrete Institute (ACI 318/318M-95).**

**7.2.2.4 Precast and Prestressed Concrete Manuals by the Prestressed Concrete Institute (PCI)**

**7.2.2.5 Building Code Requirements for Concrete Masonry Structures by American Concrete Institute (ACI 531-95).**

**7.2.2.6 Standard Specifications and Load Tables for Open Web Joists by the Steel Joist Institute (SJI)-(1994).**

**7.2.2.7 ASCE 7-95 - Minimum Design Loads for Buildings and Other Structures by the American Society of Civil Engineers (ASCE).**

**7.2.2.8 Cold-Formed Steel Design Manuals by the American Iron and Steel Institute (AISI)-(1990).**

**7.2.2.9 Welding Handbook by the American Welding Society (AWS D1.1-1998).**

**7.2.2.10 Steel Deck Institute Diaphragm Design Manual (SDI) (Second Edition).**

**7.2.2.11 PCI Mnl-116 (1985) Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products.**

**7.2.2.12 PCI Mnl-117 (1996) Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products.**

**7.2.2.13 PCI Mnl-122 (1989) Architectural Precast Concrete.01010-33**

**7.3 Design Loads.**

**7.3.1 General. Design loads shall be included in the structural notes on the contract drawings as shown in Appendix G, COE Standard Drawings Sheet S1 "General Notes".**

**7.3.2 Dead Loads. The structural system shall be designed and constructed to safely support all dead loads, permanent or temporary, including but not limited to self weight, partitions, insulation, ceiling, floor covering, and all equipment that is fixed in position. All loads and load case combinations shall be in accordance with ASCE 7. Load factors for designs shall be based on the applicable material design standard (e.g., reference ACI-318 for concrete, AISC-M018L & AISC-M019L for structural steel and etc.).**

**7.3.3 Vertical Live Loads.**

**7.3.3.1 Roofs shall be designed to support live loads, snow loads, including drifting snow, sliding snow, and rain on snow, and support wind loads including components and cladding in accordance with ASCE 7.**

**7.3.4 Horizontal Loads (Acting Inward and Outward) . The structural system wind design, including components and cladding shall be in accordance with ASCE 7, and the seismic design shall be designed in accordance with USACE TI 809-04.**

**7.4 Durability - Time Reliability.**

**7.4.1 Structural components shall be protected from condensed moisture that could impair their structural adequacy through deterioration.**

**7.4.2 Special attention shall be given to protection for corrosion or oxidation of metals, decay of wood and wood base materials, spalling of concrete, leaching of mortar, and deterioration of adhesives. Prevention of these hazards shall be especially important.**

**7.4.3 The materials used in structural elements, components, and assemblies shall be resistant to or protected from damage by exposure to normal climatic conditions.**

**7.4.4 Design the structure with enough redundancy to assure that progressive failure will not occur due to the failure of any one structural element.**

- Replace Section 2 with:

SECTION 2

DESIGN AFTER AWARD

1. GENERAL: The requirements within this section establish the design efforts of the Contractor, following Design Notice to Proceed under a Design-Build solicitation.

The plans and specifications submitted in accordance with this solicitation shall conform to the following sections. These sections are included with this Design-Build solicitation, when applicable:

a. SECTION 00800, SPECIAL CONTRACT REQUIREMENTS.

b. SECTION 1, DESIGN REQUIREMENTS.

c. SECTION 2, DESIGN AFTER AWARD.

The plans and specifications submitted in accordance with this Solicitation shall conform to the following documents. The listed documents are available in electronic format from the Government at no charge by request to the Contracting Officer's Representative:

**a. Construction Specifications Institute (CSI)**

b. Applicable sections of the Y-12 Design Standards. **(see the Engineering Interface Document, Appendix A of the base contract)**

1.1 Compliance and Certification: The Contractor shall certify that all items submitted in the design documents comply with all the stated solicitation requirements. The criteria specified in this solicitation are binding contract criteria. In case of any conflict between the solicitation criteria and Contractor's submittals, the solicitation criteria will govern.

1.2 Contractor's Role During Design Process. The Contractor's construction management key personnel shall be actively involved during the design process to effectively integrate the design and construction requirements of this contract. In addition to the typical required construction activities, the Contractor's involvement includes, but is not limited to, actions such as: integrating the design schedule into the Master Schedule to maximize the effectiveness of fast-tracking design and construction ensuring constructability and economy of the design, integrating the shop drawing and installation drawing process into the design, executing the material and equipment acquisition programs to meet critical schedules, effectively interfacing the construction QC program with the design QC program, and maintaining and providing the design team with accurate, up-to-date redline and as-built documentation. The Contractor shall require and manage the active involvement of key trade subcontractors in the above activities.

2. ORDER OF DESIGN CRITERIA PRECEDENCE: SECTION 1 DESIGN REQUIREMENTS is intended to identify specific project requirements. In cases of criteria conflict, SECTION 1 DESIGN REQUIREMENTS holds precedence over all other criteria mentioned or referenced. Guide specifications define minimum material quality requirements for material and installation.

2.1 Field Verification: The Contractor shall verify field conditions which are required for final design. The information shall be reflected in the design documents.

2.2 Drawings: Drawing format shall be in accordance with the Department of Energy (DOE) DRAFTING STANDARDS. Drawings shall be in MicroStation, latest version. **Use BWXT Y-12 provided drawing title block and drawing number.**

2.3 Design Analysis: The Design Analysis shall be developed in accordance to the criteria specified within the Design-Build solicitation, Section 1 – DESIGN REQUIREMENTS. The Design Analysis shall include all features with the necessary calculations, tables, methods and sources used in determining equipment and material sizes and capacities, and shall provide sufficient information to support the design.

2.4 Specifications: **Construction Specifications Institute (CSI)** will be provided upon request by the Contracting Officer's Representative. All specifications shall be in sufficient detail to fully describe and demonstrate the quality of materials (without the specific use of brand name products), the installation and performance of equipment, and the quality of workmanship. If specific brand names or products are required in the specifications, the Contractor shall provide an "or equal" statement and shall provide the salient characteristics that may be used to determine what is "equal". The specifications shall be in Microsoft Word 2000 format.

2.5 Certification of Computer Media: Certification of Computer Media shall be in accordance with DOE DRAFTING STANDARDS. All delivery media (CDs, etc.) for computer data shall be certified by the Contractor to be free of known computer viruses. The name(s) and release dates of the virus scanning software used to analyze the delivery media shall be furnished to the Government at time of delivery. The release of revision date of the virus scanning software shall be the current version which has detected the latest known viruses at the time of the delivery of the media. If analysis of the delivery media by the Government finds evidence of virus infection, the media will be returned to the Contractor. The Contractor shall resubmit the media at no cost to the Government.

3. DESIGN SUBMITTALS:

3.1 General: The first submittal shall **be of sufficient detail to define the design concept and identify interfaces. The purpose of the first submittal is to obtain concurrence of all stakeholders and progress to final design**. The second submittal shall include the 100 percent design. The third design submittal shall include the 100 percent corrected final design. The fourth submittal shall be the set used for construction. Further submittal clarification can be found in SECTION 1 - DESIGN REQUIREMENTS.

**3.2 Design Packages. Design packages can be prepared to facilitate the design/build delivery process. Individual packages can consist of: (1) Civil / Site (include grading, drainage, and underground utilities) (2) Architectural / Structural, (3) Mechanical, and (4) Electrical. Individual packages will be sequenced in this order. The Contractor will be responsible for all coordination.**

3.3 Contractor Design Review. The Contractor shall ensure that all design documents, including all drawings and calculations, be reviewed by a registered senior engineer/architect in the required discipline, who is independent from and not associated with the design, but who may be associated with the organization which did the original design. All drawings and design calculations in the Design Analysis shall be co-signed by the independent reviewer. The independent reviewer shall submit within the Design Analysis, a signed letter of certification stating that he/she has reviewed the design documents for that discipline, and that he/she agrees that the design is complete, correct, and in conformance with the requirements of the solicitation.

3.4 Reproduction: The Contractor shall be responsible for reproduction and distribution of design documents.

3.5 **FINAL** SUBMITTAL REQUIREMENTS: The 100 percent design shall consist of three separate submittals:

(a) Final Submittal
(b) Corrected Final Submittal
(c) Construction Set Submittal

3.6 Final Submittal: The Final Submittal shall be appropriately stamped to describe the submittal package as follows: "For Review Only - Final Design". Each sheet of the drawings shall be so stamped. **The final submittal shall be intradiscipline and interdiscipline checked.**

4. Drawings. All drawings included in the required technical data for the proposal submission shall be developed to a level of 100 percent completion. Drawings required for the 100 Percent Design Submittal shall include as a minimum:

a. General:

(1) Cover sheet and index of drawings.

b. Site Work:

(1) Existing conditions.
(2) Demolition
(3) New work.

c. Architectural:

(1) Floor plans
(2) Reflected ceiling plan.
(3) Wall sections
(4) Door, window, hardware, and room finish schedules

d. Mechanical:

(1) Mechanical (HVAC) plans and details
(2) Piping plans and details
(3) Fire Suppression drawings

e. Electrical:

(1) Electrical systems drawings; including LAN, security and fire alarm systems.

(2) Lighting Plans; including plan drawings which show the locations and installation details of the new conduits, junction boxes, outlets, and light fixture boxes.

(3) Electrical Panel schedules of all panels, panelboards, and switchboards, existing and new. Note: Panel schedules are not required for information covered on One-Line Diagrams.

(4) Details; including power connections and equipment mounting.

4.1 Corrected Final Submittal. If a sufficient number of comments are generated by the Government during the Final Design Submittal, and at the option of the Contracting Officer’s Representative, the Contractor shall submit drawings, and specifications for compliance check of the accepted review comments of the Final Design Submittal. The Corrected Final Submittal shall be appropriately stamped to describe the submittal package as follows: "For Review Only - Corrected Final". Each sheet of the drawings shall be so stamped.

4.2 Construction Set Submittal. Upon Government acceptance of all annotated comments,
the Contractor shall immediately submit a record set of construction drawings with drawing files on compact disk (CD), specifications on CD, and design analysis on CD. One CD with the drawing files, specifications, and design

analysis is preferred. The Contractor shall include complete Division 1 specifications including Table of Contents in the Construction set. Division 1 specifications are not to be altered, but shall be reproduced in their entirety as printed in the RFP.

5. AS-BUILTS: Upon completion of the design phase, the original mylar plotted drawings will be retained by the Contractor for recording of as-built conditions. Upon completion of the project, the original design documents corrected to reflect as-built conditions shall be submitted to the Contracting Officer as specified in Section 01740 of the basic contract. Compact disks with electronic files and the hardcopy documentation shall become the property of the Government.

6. TRANSMITTAL TO GOVERNMENT:

6.1 All documents must contain an index of contents.

6.2 All submittals shall be transmitted to be received in the shortest time possible. Originals of transmittal letters should be sent to the Contracting Officer's Representative, and copies should accompany each mail package. Design documents shall include drawings and specifications and shall be distributed as indicated in the distribution schedule. **Calculations shall be provided upon request of the Contracting Officer.**

6.3 The Contractor shall submit complete design documents for the required submittal in the same quantity and to the Addressee listed below for each review (one or more) until the Government is satisfied that all review comments have been addressed and resolved. Following the last review, the Contractor shall forward the completed construction documents in the number of copies specified in the Distribution Schedule.

ADDRESSEE:

U.S. Army Corps of Engineers

Nashville Resident Office

ATTN: Mike Lee

3711 Bell Rd.

Nashville, Tennessee

DISTRIBUTION SCHEDULE

| | NUMBER OF COPIES |
|---|---|
| **FIRST SUBMITTAL** AND FINAL DESIGN SUBMITTAL | |
| DRAWINGS, HALF-SIZE | **15** |
| SPECIFICATIONS | **15** |
| CORRECTED FINAL SUBMITTAL | |
| DRAWINGS, HALF-SIZE | **15** |
| SPECIFICATIONS | **15** |
| CD OF DRAWING FILES<br>includes CD with<br>drawing files IAW attached<br>Appendix, full-size plotted mylars,<br>and CD with Specifications and DA. | 2 |

**AS-BUILT**

| | |
|---|---|
| **DRAWINGS, FULL-SIZE** | **2** |
| **DRAWINGS, HALF-SIZE** | **4** |

7. DESIGN REVIEW AND REVIEW CONFERENCES: One design review conference shall be held, which will be administered by the Contracting Officer's Representative. The design conference will be a **final** design review conference to be held after completion of review of the **final** submittal.

7.1 Time Extension. If for any reason the Government requires more time than the notice given prior to the review conference and that delay causes the Contractor to exceed the set milestones, the Contractor shall be granted an extension of time equal to the number of calendar days of delay.

7.2 Design Review Conferences and Review Conference Action: Government personnel will present review comments for discussion and resolution at the design review conference. At the completion of the Design Review Conference, the Contractor shall provide copies of the comments, annotated with comment action agreed upon, to all parties within seven (5) working days of adjourning the design review conference. The Contractor shall include a memorandum of the design review meeting summarizing any major decision points and issues which require resolution. Unresolved comments will be resolved by immediate follow-on action at end of the conference.

7.3 Review Comment Annotation and Compliance.

7.4 The Government's review will consist of quality assurance (QA) checks. It will center primarily on the design's functional aspects with limited technical review. Comments will be provided in MicroSoft Word 2000. The Contractor shall annotate the review comments in the development of data for the next design level. If any review comment requires clarification and/or amplification to assure understanding, the Contractor shall notify the Contracting Officer's Representative in writing.

7.5 After each submittal, the Contractor shall make any corrections necessary (because of errors or omissions occasioned by review comments) including the preparation of addenda that may be required as a result of such deficiencies.

8. **Approval** To Proceed: The Contractor shall not proceed or initiate any work on any successive design level prior to receipt of approval of the proceeding design level.

01010A, 01120A, 01356A, 01400A

**SECTION 01010**
**SUMMARY OF WORK**

PART 1 GENERAL

1.1 SUMMARY

A. Work is located at the Y-12 National Security Complex, a government-owned facility, managed by BWXT Y-12 L.L.C. , for the Department of Energy (DOE), in Oak Ridge, Tennessee. The contracting agency for this procurement is the National Nuclear Security Administration's Y-12 Area Office (NNSA-Y12-YSO), which is a semi-independent sub-agency of DOE. This work will be performed under a DOE contract with the Contracting Officer residing in the NNSA-Y12-YSO office. The U. S. Army Corps of Engineers (USACE) Nashville District is providing project management, design, and construction management services in support of NNSA-YSO's Small Business Initiative (SBI). A USACE, Nashville District construction management engineer will be issued Contracting Officer Representative (COR) authority. A USACE, Nashville District construction representative will be at the construction site whenever construction is being performed.

B. Work under this contract consists of furnishing labor, supervision, materials, tools, equipment, and services (except that specified to be furnished or performed by others) to perform construction services and design-build services involving building renovations and upgrades, construction of new structures, miscellaneous site work, and demolition work.

C. Work may involve hazardous materials (e.g. asbestos, lead, PCBs), and may be performed in hazardous environments (e.g. confined space, hazardous energy ( i.e. high voltage)).

D. Contractor shall be capable of performing worked covered by the Davis-Bacon Act.

E. Contractor's vehicles and equipment will be subject to security inspections and radiological contamination monitoring when entering and exiting the Y-12 Complex.

F. Work shall be completed in accordance with the contract documents including contract clauses, specifications, and drawings.

1.2 RELATED SECTIONS

A. Section 01012, Site Security.

B. Section 01015, Acronyms and Definitions.

C. Section 01110, Environmental, Safety and Health.

D. Section 01120, Welding, Cutting (Burning), Grinding, and Incidental Welding Safety.

E. Section 01180, Respiratory Protection.

F. Section 01290, Payment Procedures.

G.Section 01300, Submittals.

G. Section 01320, Forms.

H. Section 01400, Quality control.
I. Section 01500, Construction Facilities and Temporary Controls.

J. Section 01550, Waste Management.

1.3 SUBMITTALS

A. Contractor will submit the following to the Contracting Officer's Representative, for information:

1. Contractor's and subcontractor's experience, qualifications, and manpower to provide construction services at the Y-12 National Security Complex.

B. Contractor will submit the following to the Contracting Officer's Representative, for approval:

1. Substance Abuse Program.
2. Corporate Health and Safety Program plus Activity Hazard Analysis for each definable feature of work.
3. Respiratory Protection Program.
4. Quality Control Program.

C. Provide submittal information in accordance with Section 01300.

D. Submit to Contracting Officer's Representative, as applicable, for approval:

1. Lift/haul plan(s), calculations, and drawings for all heavy hauls and all medium, heavy, and critical lifts.

a. Medium Lift – Any lift where the payload is 10 tons but less than 50 tons. A written detailed rigging plan is required for each medium lift.
b. Heavy Lift or Heavy Haul – Any lift or haul where the payload is 50 tons or greater. A written detailed rigging plan and supporting calculations is required for these operations.
c. Critical Lift – Any of the following conditions will cause a lift to be designated as critical:

1) Lift exceeds 90 percent of crane's chart capacity
2) Any multiple-crane lift
3) Lift presents a potential unacceptable risk of personnel injury or property damage
4) Lift could result in significant release of radioactivity, hazardous material, or other undesirable conditions
5) Lift could cause undetectable damage resulting in future operational or safety problems
6) Any lift involving a complex rigging arrangement or that requires specialty rigging
7) Any lift that requires close tolerance maneuvering

E. In addition to the above, Contractor shall submit to the Contracting Officer's Representative, for information, a signed inspection report verifying that all equipment furnished by the Contractor has been inspected for counterfeit bolts.

1.4 WORK SCHEDULE

A. Normal construction working hours at the Y-12 Complex are 7:00 a.m. – 3:30 p.m., Monday through Friday. Normal working hours do not include observed holidays. Contractor shall furnish

sufficient forces and work such hours, including night shifts and overtime hours, as are necessary to ensure completion of the work within the time required.

B. Contractor must obtain approval from the Contracting Officer's Representative at least two (2) working days in advance to perform work at the job site outside the normal working hours. Contractor shall use the Overtime Request form included in Section 01320.

C. Requests for training, badges, and vehicle access, and processing submittals will generally be performed during normal working hours.

1.5 GENERAL OPERATIONAL REQUIREMENTS

A. A pre-mobilization meeting will be held near the job site prior to the start of field work. The Contractor and their subcontractors' supervisory personnel shall attend. The Contractor and Contracting Officer's Representative will mutually agree upon the date, time, and location.

B. Contractor will provide a designated representative with full authority to take actions and observe the work being performed on the site. Designate the representative at the pre-mobilization meeting and submit any change in representation to the Contracting Officer's Representative in writing.

C. All work under this contract shall be performed in a skillful, safe, and workmanlike manner. The Contracting Officer's Representative may require, in writing, that the Contractor remove from the Y-12 Complex any Contractor or subcontractor employee the Contracting Officer's Representative deems incompetent, careless, or otherwise objectionable.

D. Progress and Coordination meetings will be held weekly. These meetings will be chaired by the Contracting Officer's Representative and will generally be held at the site of the work. Arrange to have representation and appropriate subcontractors represented at these meetings. Items include the following:

1. Current and proposed work schedules and progress.
2. Resolution of problems.
3. Requests for information.
4. Administrative matters and procedures relevant to the contract.
5. Material delivery and vendor data status.

E. Contractor will have full responsibility to act for and commit for subcontractors whether the subcontractor is present or not. Develop information required in the course of or subsequent to such meetings. The Contractor is not relieved of responsibility to fulfill the terms of this contract as a result of inferences drawn or suggestions made at these meetings.

F. Facilities in the area may be in operation during the Contractor's work. The Contracting Officer's Representative will perform coordination of operating facilities activities and the Contractor's work. Contractor will request permission from the Contracting Officer's Representative two (2) working days in advance of need to work in an operating area and receive authorization from the Contracting Officer's Representative before starting such work.

1.6 WORKPLACE SUBSTANCE ABUSE PROGRAM

A. Contractor shall comply with 10 CFR 707, Workplace Substance Abuse Programs at DOE Sites, 2002.

1. A substance abuse program is required per 707.2 (a) ii and iii. Work is considered high risk.
2. Random drug testing is required per 707.7 (b) 3, and applies to truck drivers, equipment operators, safety and health representatives, and personnel making critical decisions.

B. Submit Substance Abuse Program to the Contracting Officer’s Representative, for approval, with the General Order Agreement.

1. The Contractor's Substance Abuse Program must be approved before any work can be performed on site.

1.7 SPECIFICATIONS AND DRAWINGS

A. The Contracting Officer’s Representative will furnish three (3) copies of specifications and drawings to the Contractor.

B. The specifications are written in a streamlined form, and are directed to the Contractor, unless specifically noted otherwise.

C. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

D. Specification section Division 1 governs over other Divisions of the specifications.

1.8 EMPLOYEE TRAINING

A. The contractor will be provided, General Employee Training and other specific compliance-related training. There will be no cost to the contractor for this particular training other than the contractor’s employee’s labor cost, transportation, and other incidental costs. Any other training will be the obligation of the Contractor.

B. The attached Training Table identifies Y-12 training which may be required for the Contractor's employees. The Contractor is responsible to determine if additional training is required based on Federal and State of Tennessee laws, and method of accomplishment of the work scope.

C. Contractor shall complete and submit the Request for Y-12 National Security Complex Training form (Section 01320) to the COR to request training.

1.9 WORKING AND STORAGE AREAS

A. Contractor will limit activities and storage to the immediate contract work area and storage areas designated by the Contracting Officer’s Representative.

B. Contractor will store only work-related material and equipment in stockpile areas, storage trailers, and designated storage sites located at the Y-12 Complex.

C. Parking along roads is prohibited.

D. Contractor will perform cleanup, trash disposal, and neatly arrange material and equipment on a daily basis.

1.10 WORK COORDINATION

A. The work area may be co-occupied by other DOE contractors during performance of the work. Contractor will protect their equipment, tools, materials, and facilities from damage, and all personnel from injury during execution of work. Contracting Officer’s Representative will coordinate work with existing activities.

B. A Contractor's representative will attend daily "plan of the day" meetings conducted by the Contracting Officer’s Representative or BWXT Y-12 representative as may be required. In such

cases, Contractor will submit a work plan that briefly identifies work activities for the following day.

C. Contractor will submit requests for outages a minimum of five (5) working days in advance of need. The Contracting Officer's Representative will coordinate with BWXT Y-12 and provide an approved outage schedule. Hold outages to a minimum in number and duration.

D. The Contractor shall request Excavation/Penetration Permits from the Contracting Officer's Representative **following completion of design and (2) weeks in advance of need.** Contractor will request specific permits (such as hotwork, confined space) two (2) working days in advance of need. These permits will be issued by BWXT Y-12.

E. Contractor will fully cooperate with employees of BWXT Y-12 and BWXT Y-12 subcontractors. Do not commit or permit any act that will interfere with the performance of work by employees of BWXT Y-12 or BWXT Y-12 subcontractors.

1.11 PROCUREMENT, DELIVERY, STORAGE, AND HANDLING

A. After the Notice to Proceed is received, or earlier if formally notified by the Contracting Officer's Representative, promptly place orders for equipment, materials, and services required to complete the scope of work.

B. Notify the Contracting Officer's Representative of changes in deliveries or circumstances that would affect timely delivery of equipment, materials, and services required to complete the scope of work.

C. Requests from the Contractor for an extension of time for completion because of late delivery of equipment, material, or services shall be submitted to the Contracting Officer's Representative in writing and shall be accompanied by documentation showing the Contractor's efforts to obtain timely delivery.

D. Contractor will comply with instructions, recommendations, and requirements stated by the manufacturer for handling and storing of material and equipment. Protect materials and equipment from moisture, dust, and damage including indoor storage when necessary.

E. Identify items delivered to the site with a weather-resistant tag or label with Contractor's name, contract number, and contents.

F. Train operators in use of special handling or lifting equipment. Transport to the site all equipment and materials used in performance of the contract.

G. Requests by the Contracting Officer's Representative to enclose or specially protect specific property shall be complied with.

H. Locate equipment and materials only in areas designated by the Contracting Officer's Representative. Keep storage area clean, accessible, arrange to drain properly, and protected from the weather.

I. Only materials and equipment to be used in the performance of the contract work may be located on Y12 property. The Contractor shall be responsible for all loss, destruction, or damage to property on the Y-12 Complex (including work in progress).

J. The Contractor may, subject to other provisions of this contract, employ personnel sufficient to protect its property.

K. Deliver materials to the job site in a new condition and unload, handle, and protect during storage and installation so as to maintain the new condition until final acceptance by the Contracting Officer's Representative.

L. Report damage incurred in transit or on site to the Contracting Officer's Representative. Damaged materials shall be replaced or repaired.

1.12 EXCESS MATERIALS AND EQUIPMENT

A. Dispose of excess material or equipment, due to design or scope changes, only with permission of the Contracting Officer's Representative.

1.13 EXECUTION

A. Work Plan:

1. Prepare a work plan that includes:

a. Technical approach techniques.
b. Inspection and tests.
c. Assignment of responsibilities.
d. Equipment.
e. Characterization.
f. Sampling and Analysis.
g. Safety and Health oversight.
h. Waste Management.
i. Submittal dates for specified submittals.
j. Schedule/work sequence.

1.14 DAILY ACTIVITIES AND MANPOWER REPORT

Submit a daily report to the Contracting Officer's Representative showing the following:

1. Contract Number.
2. Project Name.
3. Number of employees of Contractor and its subcontractors.
4. Equipment on site and the condition of the equipment.
5. Names of visitors.
6. Description of work, tests, or inspections performed.
7. Safety observations/incident.
8. General comments (e.g. delays or disruptions).
9. Contractor's Superintendent's Signature.

1.15 TESTING

A. The Contractor may be required to perform the following minimal tests if specifically required by the contract plans and specifications:

1. Compaction tests for soils, aggregate, and asphalt.
2. Slump, air, and compression (strength) tests for concrete.
3. Leak testing of HEPA-filtered equipment.
4. Sample analysis.
5. Construction Acceptance Tests (e.g. hydrostatic tests, megger tests, continuity checks, and motor rotations).
6. On-site welding/tests inspections.

B. Contractor will provide labor and technical support, annually calibrated (unless more frequent calibration is specified) and properly maintained equipment, and material required to perform testing. Equipment calibration records shall be submitted to the Contracting Officer's Representative upon request.

C. Notify the Contracting Officer's Representative one (1) day (two (2) days for fire or sprinkler systems) before performing tests and inspections. Perform tests and inspections in a manner that allows observation by the Contracting Officer's Representative.

D. Submit a copy of tests performed to the Contracting Officer's Representative along with daily reports.

E. Contractor shall not be required to perform characterization, sampling, and analysis for radioactive material contamination. This service shall be provided by others, i.e., the onsite consultant, BWXT.

1.16 DELIVERABLES

A. Contractor Deliverables – Manage, report, and resolve any personnel issues and/or concerns. Perform the tasks as required by the contract in a safe and timely fashion, and in accordance with all contract requirements.

END OF SECTION

**TRAINING MATRIX**

| Module Title | Duration | Frequency | Provided by |
|---|---|---|---|
| **GENERAL EMPLOYEE TRAINING (GET)** | | | |
| Basic General Employee Training | 4 hours | Every 2 years | BWXT Y-12 for NNSA-YSO |
| ORR Employee Emergency Plan | 1 hour | Once | BWXT Y-12 for NNSA-YSO |
| Prevention of Work Place Violence | 1 hour | Once | BWXT Y-12 for NNSA-YSO |
| Fire Extinguisher Required Read | ½ hour | Every Year | BWXT Y-12 for NNSA-YSO |
| **INDUSTRIAL HYGIENE AND HEALTH** | | | |
| Lead Worker Protection (if applicable) | 4 hours | Every Year | Contractor |
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| **RADIOLOGICAL CONTROL** | | | |
| Source User, Required Reading | 0.5 hours | Once | BWXT Y-12 for NNSA-YSO |
| Radiographer Certification (use of Radiation Generating Devices) | * requires written exam documentation | Current | Contractor |
| Radiation Safety Training for use of Density Gauge | * requires written exam documentation | Current | Contractor |
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**TRAINING MATRIX**

| Module Title | Duration | Frequency | Provided by |
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| **PERSONAL PROTECTIVE EQUIPMENT** | | | |
| PPE Awareness for all Employees | 1 hour | New employees and whenever operations change | Contractor |
| **HOT WORK** | | | |
| Approved Training that Meets Module 11655 | | Issuing Authorities / Service Supervisors | |
| Approved Training that Meets Module 10389 | | Welder / Fire Watcher(s) | |
| | | | |
| **SECURITY** | | | |
| Comprehensive Security Briefing | 1 hour | Once | BWXT Y-12 for NNSA-YSO |
| Annual Security Refresher Briefing | 0.5 hour | Every year | BWXT Y-12 for NNSA-YSO |
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**TRAINING MATRIX**

| Module Title | Duration | Frequency | Provided by |
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| | | | |
| **CONTRACTOR-SPECIFIC TRAINING** | | | |
| Environmental, Safety and Health (ES&H) Program | | As Required | Contractor |
| Contract-Specific ES&H Plan | | As Required | Contractor |

SECTION 01120
WELDING, CUTTING (BURNING),
GRINDING, AND INCIDENTAL WELDING SAFETY

PART 1 GENERAL

1.1 SUMMARY

A. This section includes on-site safety requirements for incidental welding, cutting, burning, grinding, and hotwork. **Such activities are discouraged on-site, and should be avoided unless absolutely necessary**, but if required shall be accomplished as described herein, and will be subject to approval of the COR.

1.2 DEFINITIONS

A. Hotwork and Welding Permit: A permit issued, before start of hotwork or welding activities, used to ensure the work area is inspected and safety requirements are met.

B. Incidental Welding: Welding required to perform work without technical requirements. Examples are welds on gang boxes, tool fixtures, weather caps for nonwelding ductwork systems, and electrical system racks that are not identified as seismically qualified. Tack welds, temporary attachments to systems, structures, and components are not incidental welds.

1. On-Site Welding: Welding activities within the Y-12 National Security Complex.

2. Off-Site Welding: Welding activities that occur outside boundaries of the Complex.

1.3 RELATED SECTIONS

N/A

1.4 REFERENCES

A. NFPA Standard 51B-1998, Standard for Fire Prevention During Cutting, Welding, and Other Hot Work, 1999.

B. OSHA 29 CFR 1926, Subpart J, Welding and Cutting, Parts 350-354, 2002.

C. American Welding Society (AWS) Z49.1, 1999, Safety in Welding, Cutting and Allied Processes.

D. ASTM D 3659-80 (1993) Standard Method for Flammability of Apparel Fabrics by Semi-Resistant Method.

E. ASTM F 1506-98, Standard Performance Specification for Textile Materials for Wearing Apparel for Use by Electrical Workers Exposed to Momentary Electric Arc and Related Thermal Hazards.

F. ACGIH 0022, TLVs, and Biological Exposure Indices, Latest Revision.

G. 29 CFR, Subpart Z, Toxic and Hazardous Substances, 2002.

PART 2 PRODUCTS

2.1 MATERIAL

A. Flame-resistant (FR) clothing shall conform to ASTM D 3659 and ASTM F 1506.

PART 3 EXECUTION

3.1 CUTTING, GRINDING, AND WELDING

A. Contractor shall implement a permit system for hotwork/welding activities. Contractor shall follow Y79-002 for hotwork permits, unless a hotwork plan is reviewed and approved by Y-12 ES&H.

B. Perform welding, burning, and hotwork in accordance with 29 CFR 1926, Subpart J, and ANSI Z 49.1.

C. Use dust-reducing methods, such as vacuuming, wetting, or building an enclosure during cutting or grinding operations. If concentrations are above the threshold limits, use appropriate PPE.

D. Follow the requirements of 29 CFR 1926.62 when drilling, cutting, grinding, or welding existing painted surfaces.

E. Follow the requirements of 29 CFR 1926.350-354 when welding, cutting, grinding, or heating of galvanized or stainless steel.

F. Provide point source exhaust ventilation when welding stainless steel material and alloys in the field and fabrication areas.

3.2 ON-SITE INCIDENTAL WELDING

A. Visual inspection of incidental welds is sufficient.

3.3 ON-SITE WELDING

A. NNSA Site
Welding Guidelines.

3.4 PROTECTION

A. Perform an Activity Hazard Analysis for welding, cutting, grinding, and incidental welding for tasks using the clothing ignition risk factors noted.

B. In determining the need for PPE for protection from flame and thermal hazards and flame resistant clothing for protection from ignition hazards, the following risk factors apply:

1. Amount and duration of open flame, sparks, molten by-products (examples of tasks with risk factors include, but are not limited to, torch cutting, and plasma arc cutting).
2. Potential for accidental contact with direct flame or hot surfaces.
3. Position/proximity of worker relative to flames, sparks, or molten by-products (e.g. worker directly beneath a work piece and shower of sparks, slag, heat shrink, confined space).
4. Risk factors created by PPE worn, such as heat stress, physical and psychological stress, impaired vision, mobility, and communications (e.g. use of a respirator, helmet, and heavy gloves while cutting).

C. These risk factors shall be identified and controlled or eliminated through engineering and administrative controls (e.g. substitution of a less hazardous method [mechanical rather than torch cutting], shielding/guarding, or primary barriers such as welding blankets). Where the risk factors cannot be eliminated or controlled to acceptable levels using engineering and administrative controls, PPE is required. If clothing ignition hazards still exist, FR protective clothing must be used.

D. Personnel performing welding, cutting, grinding, and incidental welding tasks (including fire watch personnel and proximate workers) shall wear PPE as described below, for primary protection from flame and thermal hazards based on potential exposures as determined by the Activity Hazard Analyses.

1. Gloves made of leather, or other suitable materials as identified in the Activity Hazard Analyses, with insulating linings that are in good repair, dry, and capable of providing protection from high radiant energy.
2. Aprons made of leather or suitable materials that protect the front of the body, when additional protection against sparks and radiant energy is needed.
3. Leggings made of leather or suitable materials or other equivalent means to give added protection to the legs when performing hot work.
4. Cape sleeves or shoulder covers with bibs made of leather or other suitable materials, as necessary, when performing overhead welding, cutting, or other operations.

E. Personnel performing welding, cutting, grinding, and incidental welding tasks (including fire watch personnel and proximate workers) in a radiologically controlled area shall wear flame resistant (FR) PPE as described below, for primary protection from flame and thermal hazards based on potential exposures as determined by the Activity Hazards Analyses.

1. Outer FR-treated anti-contamination clothing (i.e. Anti-C coveralls, hoods).

F. Provide continuous fire watch during on-site cutting, welding, burning, and hotwork operations. Maintain fire watch during work breaks, lunch breaks, and 30 minutes after completion or work or after quitting time. Fire watch personnel shall not perform other tasks during the fire watch period.

G. Train fire watch personnel in accordance with NFPA Standard 51B. Fire watch and welders shall be trained to by Y-12 Module 10389 per Y79-002 unless Y-12 ES&H approves otherwise.

## NNSA Site Welding Guidelines

PURPOSE

This guideline outlines the National Nuclear Security Administration (NNSA) Y-12 Site Office requirements for subcontractors and their sub-tiers to perform welding activities at the Y-12 Site under NNSA YSO contracts. The welds to be performed under these contracts are not expected to be associated with process or utility piping, but are expected to be associated with handrails and light-duty structural joints for convenience and costs rather than using bolted connections.

SCOPE

This guideline includes but is not limited to the control of welding rod, used of pre-qualified joints and acceptance of completed welds.

WELDING PROCEDURE

The majority of welding that is to be performed is light-duty structural and the NNSA incorporates by reference American Welding Society (AWS) D1.1 (Latest Edition) as the standard specification for light-duty structural welding at the Y-12 Site under the NNSA contracts.

A) This includes the pre-qualified joints referenced in AWS D1.1. If the per-qualified joint is not specified the subcontractor's subject matter expert will select the proper pre-qualified joint for use and submit it for approval.
B) Procedures not covered by AWS D1.1 will be qualified at the subcontractor's expense per the requirements of AWS D1.1.

WELDER QUALIFICATION

Welders employed by the subcontractor shall provide proof to NNSA that they are qualified to perform the specified welding per AWS D1.1.

WELD FILLER METAL CONTROL

A supervisor for the subcontractor shall be responsible for filler metal control and issue. As a minimum the following applies to control of filler metal:

- A new container shall be used for each day's welding operations.
- The container shall be marked showing the day it was opened.
- The containers will be Issued only to qualified welders.
- The responsible supervisor will keep track of the amount of rod issued to each welder and account for all stubs and rod upon return at the completion of the shift or welding assignment.
- The welder shall keep the rods in the appropriate caddy and place all stubs in a stub bucket.
- The welder shall return all stubs and unused rod to the issuing supervisor and be able to account for all welding material.
- At the end of the shift, the subcontractor will remove the excess rod and stubs from site. The remaining rod shall not be reused on site. The stubs will be disposed of off site.
- The subcontractor shall be able to substantiate this by keeping a log of weld filler material issued for a given day and to whom it was issued. The amount returned including stubs and that the excess rod and stubs were removed from site.

ACCEPTANCE OF COMPLETED WORK

The acceptance criteria will be graded to the level of the work performed. For simple tasks such as welding handrail sections together a person possessing "General Welding" knowledge may inspect the welds for items such as lack of fusion, undercut and general transition and smoothness. A letter will be written and provided to the NNSA stating that the welds were inspected for the previously mentioned items.

For light-duty structural welds where the safety of the site population and public and performance of the structure would be affected an AWS Certified Welding Inspector (CWI) shall be used. Full penetration welds shall have a mandatory hold point for fit-up including back gouging when a backing bar is not used. Other welds shall be inspected on a 20% basis for fit-up and bevel preparation, and 100% of finished welds shall be inspected. The CWI shall provide documentation of inspections that includes his/her certification stamp and signature.

The subcontractor shall submit these items to the NNSA upon completion of the work.

END OF SECTION

**SECTION 01356**
**STORM WATER POLLUTION PREVENTION MEASURES**

## PART 1 GENERAL

### 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

| | |
|---|---|
| ASTM D 4439 | (1997) Standard Terminology for Geosynthetics |
| ASTM D 4491 | (1996) Water Permeability of Geotextiles by Permittivity |
| ASTM D 4533 | (1991; R 1996) Trapezoid Tearing Strength of Geotextiles |
| ASTM D 4632 | (1991; R 1996)) Grab Breaking Load and Elongation of Geotextiles |
| ASTM D 4751 | (1995) Determining Apparent Opening Size of a Geotextile |
| ASTM D 4873 | (1995) Identification, Storage, and Handling of Geosynthetic Rolls |

The Contractor shall implement the storm water pollution prevention measures specified in this section in a manner which will meet the equirements of the National Pollution Discharge Elimination System (NPDES) permit.

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. The following shall be submitted in accordance with Section 01300- SUBMITTALS

SD-07 Certificates

Mill Certificate or Affidavit.

Certificate attesting that the Contractor has met all specified requirements.

The controls and measures required by the Contractor are described below.

### 1.2 GENERAL
#### 1.4.1 Stabilization Practices
### 1.3 SUBMITTALS
### 1.4EROSION AND SEDIMENT CONTROLS

The stabilization practices to be implemented shall include temporary seeding and mulching. On his daily CQC Report, the Contractor shall record the dates when the major grading activities occur, (e.g., excavation, embankment, and grading); when construction activities temporarily or permanently cease on a portion of the site; and when stabilization practices are initiated. Except as provided in paragraphs UNSUITABLE CONDITIONS and NO ACTIVITY FOR LESS THAN 21 DAYS, stabilization practices shall be initiated as

soon as practicable, but no more than 14 days, in any portion of the site where construction activities have permanently ceased.

#### 1. 1.4.1.1 Unsuitable Conditions

Where the initiation of stabilization measures by the fourteenth day after construction activity permanently ceases is precluded by unsuitable conditions caused by the weather, stabilization practices shall be initiated as soon as practicable after conditions become suitable.

#### 2. 1.4.1.2 No Activity for Less Than 21 Days

Where construction activity will resume on a portion of the site within 21 days from when activities ceased (e.g., the total time period that construction activity is temporarily ceased is less than 21 days), then stabilization practices do not have to be initiated on that portion of the site by the fourteenth day after construction activity temporarily ceased.

### 1.4.2 Structural Practices

Structural practices shall be implemented to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Structural practices shall be implemented in a timely manner during the construction process to minimize erosion and sediment runoff. Structural practices shall include the following devices.

#### 3. 1.4.2.1 Silt Fences

The Contractor shall provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Silt fences shall be properly installed to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, excavation, embankment, and grading). Final removal of silt fence barriers shall be upon approval by the Contracting Officer.

#### 4. 1.4.2.2 Straw Bales

The Contractor shall provide bales of straw as a temporary structural practice to minimize erosion and sediment runoff. Bales shall be properly placed to effectively retain sediment immediately after completing each phase of work (e.g., clearing and grubbing, excavation, embankment, and grading) in each independent runoff area (e.g., after clearing and grubbing in a area between a ridge and drain, bales shall be placed as work progresses, bales shall be removed/replaced/relocated as needed for work to progress in the drainage area). Areas where straw bales are to be used are shown on the drawings. Final removal of straw bale barriers shall be upon approval by the Contracting Officer. Rows of bales of straw shall be provided as follows:

a. Along the downhill perimeter edge of all areas disturbed.

b. Along the top of the slope or top bank of drainage ditches, channels, swales, etc. that traverse disturbed areas.

c. Along the toe of all cut slopes and fill slopes of the construction areas.

d. Perpendicular to the flow in the bottom of existing drainage ditches, channels, swales, etc. that traverse disturbed areas or carry runoff from disturbed areas. Rows shall be spaced a maximum of 30 meters apart.

e. Perpendicular to the flow in the bottom of new drainage ditches, channels, and swales. Rows shall be spaced a maximum of 30 meters apart.

f. At the entrance to culverts that receive runoff from disturbed areas.

## PART 2 PRODUCTS

### 2.1 COMPONENTS FOR SILT FENCES

#### 2.1.1 Filter Fabric

The geotextile shall comply with the requirements of ASTM D 4439, and shall consist of polymeric filaments, which are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, or amide, and shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistance to deterioration due to ultraviolet and heat exposure. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of -18 to 49 degrees C (0 to 120 degrees F). The filter fabric shall meet the following requirements:

FILTER FABRIC FOR SILT SCREEN FENCE

| PHYSICAL PROPERTY | TEST PROCEDURE | STRENGTH REQUIREMENT |
|---|---|---|
| Grab Tensile<br>Elongation (%) | ASTM D 4632 | 100 lbs. min.<br>30 % max. |
| Trapezoid Tear | ASTM D 4533 | 55 lbs. min. |
| Permittivity | ASTM D 4491 | 0.2 sec-1 |
| AOS (U.S. Std Sieve) | ASTM D 4751 | 20-100 |

#### 2.1.2 Silt Fence Stakes and Posts

The Contractor may use either wooden stakes or steel posts for fence construction. Wooden stakes utilized for silt fence construction, shall have a minimum cross section of 50 mm by 50 mm (2 inches by 2 inches) when oak is used and 100 mm by 100 mm (4 inches by 4 inches) when pine is used, and shall have a minimum length of 1.5 m (5 feet). Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum mass of 1.98 kg per linear meter (weight of 1.33 pounds per linear foot) and a minimum length of 1.5 m (5 feet).

#### 2.1.3 Mill Certificate or Affidavit

A mill certificate or affidavit shall be provided attesting that the fabric and factory seams meet chemical, physical, and manufacturing requirements specified above. The mill certificate or affidavit shall specify the actual Minimum Average Roll Values and shall identify the fabric supplied by roll identification numbers. The Contractor shall submit a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the filter fabric.

#### 2.1.4 Identification Storage and Handling

Filter fabric shall be identified, stored and handled in accordance with ASTM D 4873.

The straw in the bales shall be stalks from oats, wheat, rye, barley, rice, or from grasses such as byhalia, bermuda, etc., furnished in air dry condition. The bales shall have a standard cross section of 350 mm by 450 mm (14

inches by 18 inches). All bales shall be either wire-bound or string-tied. The Contractor may use either wooden stakes or steel posts to secure the straw bales to the ground. Wooden stakes utilized for this purpose, shall have a minimum dimensions of 50 mm by 50 mm (2 inches x 2 inches) in cross section and shall have a minimum length of 1 m (3 feet). Steel posts (standard "U" or "T" section) utilized for securing straw bales, shall have a minimum mass of 1.98 kg per linear meter (weight of 1.33 pounds per linear foot) and a minimum length of 1 m (3 feet).

## PART 3 EXECUTION

Silt fences shall extend a minimum of 400 mm (16 inches) above the ground surface and shall not exceed 860 mm (34 inches) above the ground surface. Filter fabric shall be from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, filter fabric shall be spliced together at a support post, with a minimum 150 mm (6 inches) overlap, and securely sealed. A trench shall be excavated approximately 100 mm (4 inches) wide and 100 mm (4 inches) deep on the upslope side of the location of the silt fence. The 100 mm by 100 mm (4 inches by 4 inches) trench shall be backfilled and the soil compacted over the filter fabric. Silt fences shall be removed upon approval by the Contracting Officer.

Straw bales shall be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. Straw bales shall be installed so that bindings are oriented around the sides rather than along the tops and bottoms of the bales in order to prevent deterioration of the bindings. The barrier shall be entrenched and backfilled. A trench shall be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 100 mm. (4 inches.) After the bales are staked and chinked (gaps filled by wedging with straw), the excavated soil shall be backfilled against the barrier. Backfill soil shall conform to the ground level on the downhill side and shall be built up to 100 mm (4 inches) against the uphill side of the barrier. Loose straw shall be scattered over the area immediately uphill from a straw bale barrier to increase barrier efficiency. Each bale shall be securely anchored by at least two stakes driven through the bale. The first stake or steel post in each bale shall be driven toward the previously laid bale to force the bales together. Stakes or steel pickets shall be driven a minimum 450 mm (18 inches) deep into the ground to securely anchor the bales.

The Contractor shall maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. The following procedures shall be followed to maintain the protective measures.

### 3.3.1 Silt Fence Maintenance

Silt fences shall be inspected in accordance with paragraph INSPECTIONS. Any required repairs shall be made promptly. Close attention shall be paid to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, the fabric shall be replaced promptly. Sediment deposits shall be removed when deposits reach one-third of the height of the barrier. When a silt fence is no longer required, it shall be removed. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade.

### 3.3.2 Straw Bale Maintenance

Straw bale barriers shall be inspected in accordance with paragraph INSPECTIONS. Close attention shall be paid to the repair of damaged bales, end runs and undercutting beneath bales. Necessary repairs to barriers or replacement of bales shall be accomplished promptly. Sediment deposits shall be removed when deposits reach one-half of the height of the barrier. Bale rows used to retain sediment shall be turned uphill at each end of each

row. When a straw bale barrier is no longer required, it shall be removed. The immediate area occupied by the bales and any sediment deposits shall be shaped to an acceptable grade.

### 3.4.1 General

The Contractor shall inspect disturbed areas of the construction site, areas used for storage of materials that are exposed to precipitation that have not been finally stabilized, stabilization practices, structural practices, other controls, and area where vehicles exit the site at least once every seven (7) calendar days and within 24 hours of the end of any storm that produces 13 mm (0.5 inch) or more rainfall at the site. Where sites have been finally stabilized, such inspection shall be conducted at least once every month.

### 3.4.2 Inspections Details

Disturbed areas and areas used for material storage that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the Storm Water Pollution Prevention Plan shall be observed to ensure that they are operating correctly. Discharge locations or points shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles exit the site shall be inspected for evidence of offsite sediment tracking.

### 3.4.3 Inspection Reports

For each inspection conducted, the Contractor shall prepare a report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Storm Water Pollution Prevention Plan, maintenance performed, and actions taken. The report shall be furnished to the Contracting Officer within 24 hours of the inspection as a part of the Contractor's daily CQC REPORT. A copy of the inspection report shall be maintained on the job site.

### 3.4.4 Monthly Inspection Report and Certification Form for Erosion and Sediment Controls

On the first working day of each month the Contractor shall complete, sign, and submit the original form to **the BWXT Construction Contact for quarterly submittal to the State**. On the first working day of each month the Contractor shall also furnish one copy of the form submitted to the OPC to the Contracting Officer as part of the Contractor's daily CQC Report and attach a copy of the completed form to the Plan. Unless otherwise notified by the OPC, the Contractor shall submit the Monthly Inspection Report and Certification Forms for an additional two months after the final completion of all storm water pollution prevention measures required in this contract have been implemented.

-- End Of Section --

SECTION 01400

QUALITY CONTROL

**PART 1 - GENERAL**

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

| | |
|---|---|
| ASTM D 3740 | (2001) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction |
| ASTM E 329 | (2000b) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction |

U.S. ARMY CORPS OF ENGINEERS (USACE)

ER 1110-1-12 Quality Management

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Bidding Schedule.

**PART 2 - PRODUCTS (Not Applicable)**

**PART 3 - EXECUTION**

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction". The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The site project superintendent ***and Contractor's QC staff*** will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the contract. The site project superintendent in this context shall be the highest level manager responsible for the overall construction activities at the site, including quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Contracting Officer, and shall be responsible for all construction and construction related activities at the site.

The Contractor shall furnish for review by the Government, not later than 10 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first 60 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

### 3.2.1 Design Quality Control (DQC) Plan For Design/Build Projects Only

The Contractor's DQC Plan shall provide and maintain an effective quality control program which will assure that all services required by this design-build contract are performed and provided in a manner that meets professional architectural and engineering quality standards. The Contractor's DQC Plan shall be prepared in accordance with CESPDR 1110-1-8, "Quality Management Plan", Appendix D. As a minimum, all documents shall be technically reviewed by competent, independent reviewers identified in the DQC Plan. Performance of the independent technical review (ITR) should not be accomplished by the same element that produced the product. In addition, the DQC Plan shall incorporate the Lessons Learned Databases provided by the Government. Errors and deficiencies in the design documents shall be corrected prior to submitting them to the Government.

The Contractor shall include in the DQC plan a time-scaled bar chart or Critical Path Method (CPM) design schedule showing the sequence of events involved in carrying out the project tasks within the specific contract period. This should be at a detailed level of scheduling sufficient to identify all major tasks including those that control the flow of work. The bar chart or schedule shall include review and correction periods proper to submittal of each item. This should be a forward planning as well as a project monitoring tool. The bar chart or schedule reflects calendar days and not dates for each activity. If the schedule is changed, the Contractor shall submit a revised bar chart or schedule reflecting the change within seven calendar days. The Contractor shall include in the DQC Plan the discipline-specific checklists to be used during the design and quality control of each submittal. These completed checklists shall be submitted at each design phase as part of the project documentation. Example checklists can be found in ER 1110-1-12.

The DQC Plan shall be implemented by an assigned person with the Contractor's organization who has the responsibility of being present during the times work is in progress, and shall be cognizant of and assure that all documents on the project have been coordinated. This individual shall be a person who has verifiable engineering or architectural design experience and is a registered professional engineer or architect. The Contractor shall notify the Contracting Officer, in writing, of the name of the individual and the name of an alternate person assigned to the position.

The Contracting Officer will notify the Contractor, in writing, of the acceptance of the DQC Plan. After acceptance, any changes proposed by the Contractor are subject to the acceptance of the Contracting Officer.

### 3.2.2 Content of the Construction CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:

a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the project superintendent.

b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.

c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Government.

d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01300 – SUBMITTALS.

e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved by the Contracting Officer.)

f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.

h. Reporting procedures, including proposed reporting formats.

i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.

### 3.2.3 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

### 3.2.4 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

## 3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the CQC Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 10 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file.

There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

### 3.4.1 Personnel Requirements

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure safety and contract compliance. Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as part of the CQC organization. The Contractor's CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer. The Contractor shall provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Complete records of all letters, material submittals, show drawing submittals, schedules and all other project documentation shall be promptly furnished to the CQC organization by the Contractor. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

### 3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a graduate engineer, graduate architect, or a graduate of construction management, with a minimum of 5 years construction experience on construction similar to this contract, or a construction person with a minimum of 10 years in related work. This CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor. The CQC System Manager shall be assigned as System Manager but may have duties as project superintendent in addition to quality control. An alternate for the CQC System Manager shall be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager.

## 3.4QUALITY CONTROL ORGANIZATION

### 3.4.3 CQC Personnel

In addition to CQC personnel specified elsewhere in the contract, the Contractor shall provide as part of the CQC organization specialized personnel to assist the CQC System Manager when required by the Contracting Officer. These individuals may be employees of the prime or subcontractor; be responsible to the CQC System Manager; be physically present at the construction site during work on their areas of responsibility; have the necessary education and/or experience in the required discipline. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan.

### 3.4.4 Additional Requirement

In addition to the above experience and education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management For Contractors".

**3.4.5 Organizational Changes**

The Contractor shall obtain Contracting Officer's acceptance before replacing any member of the CQC staff. Requests shall include the names, qualifications, duties, and responsibilities of each proposed replacement. Upon acceptance of any changes, the Contractor shall revise the CQC plan to accurately reflect the changes. The CQC plan shall be kept current at all times during the life of the contract.

Submittals, if needed, shall be made as specified in Section 01300- SUBMITTALS. CQC organization shall be responsible for certifying that all submittals and deliverables are in compliance with the contract requirements. When Section, HEATING, VENTILATING AND AIR CONDITIONING (HVAC) CONTROL SYSTEMS; DIRECT DIGITAL CONTROL FOR HVAC; TESTING, ADJUSTING, AND BALANCING OF HVAC SYSTEMS; or COMMISSIONING OF HVAC SYSTEMS are included in the contract, the submittals required by those sections shall be coordinated with Section 01300- SUBMITTALS to ensure adequate time is allowed for each type of submittal required.

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of work as follows:

**3.6.1 Preparatory Phase**

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

a. A review of each paragraph of applicable specifications, reference codes, and standards. A copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field shall be made available by the Contractor at the preparatory inspection. These copies shall be maintained in the field and available for use by Government personnel until final acceptance of the work.

b. A review of the contract drawings.

c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.

d. Review of provisions that have been made to provide required control inspection and testing.

e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

g. A review of the appropriate activity hazard analysis to assure safety requirements are met.

h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

j. Discussion of the initial control phase.

k. The Government shall be notified at least 72 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the

superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

**3.6.2 Initial Phase**

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

a. A check of work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.

c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

d. Resolve all differences.

e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

f. The Government shall be notified at least 24 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

g. The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

**3.6.3 Follow-up Phase**

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

**3.6.4 Additional Preparatory and Initial Phases**

Additional preparatory and initial phases shall be conducted on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

### 3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. The Contractor shall perform the following activities and record and provide the following data:

a. Verify that testing procedures comply with contract requirements.

b. Verify that facilities and testing equipment are available and comply with testing standards.

c. Check test instrument calibration data against certified standards.

d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

e. Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

### 3.7.2 Testing Laboratories

#### 3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

#### 3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of $1,000.00 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

### 3.7.3 Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

### 3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Corps of Engineers Division Laboratory, f.o.b., at the following address:

Commander, U.S. Army Engineer Waterways Experiment Station
ATTN: CEWES-SC
3909 Halls Ferry Road
Vicksburg, Mississippi 39180-6199

Coordination for each specific test, exact delivery location, and dates will be made through the Area Office.

### 3.8.1 Punch-Out Inspection

Near the end of the work, or any increment of the work established by a time stated in the Special Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications, the CQC Manager shall conduct an inspection of the work. A punch list of items which do not conform to the approved drawings and specifications shall be prepared and included in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

### 3.8.2 Pre-Final Inspection

The Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

### 3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at the final acceptance inspection. Additional Government personnel including, but not limited to, those from ***BWXT Y-12*** may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

**3.8.4 Post Completion Feedback Meeting and Preparation of Written Minutes**

At the completion of this project, the CQC Systems Manager will host a meeting to review the project and to discuss lessons learned during the construction of the project. This meeting should be scheduled for 4 hours on-site and should be attended by the Project Manager and representatives of the major subcontractors, including mechanical and electrical. The Contracting Officer will invite members of the design team to participate in this meeting.

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

a. Contractor/subcontractor and their area of responsibility.

b. Operating plant/equipment with hours worked, idle, or down for repair.

c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.

d. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase shall be identified (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.

e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.

f. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.

g. Offsite surveillance activities, including actions taken.

h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

i. Instructions given/received and conflicts in plans and/or specifications.

j. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 24 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

### 3.9.1 Correspondence

The Contractor shall establish and implement a serialized numbering system for letters sent to the Government. The numbering system shall identify the contract number and shall progress sequentially starting with the number one (1) and continuing thereafter without break in numbering. All letters sent to the Government shall include a subject heading which identifies the Contract Clause Number, Special Clause Number, or Technical Provision Number, and the particular subject item addressed by the letter.

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

- - End of Section - -